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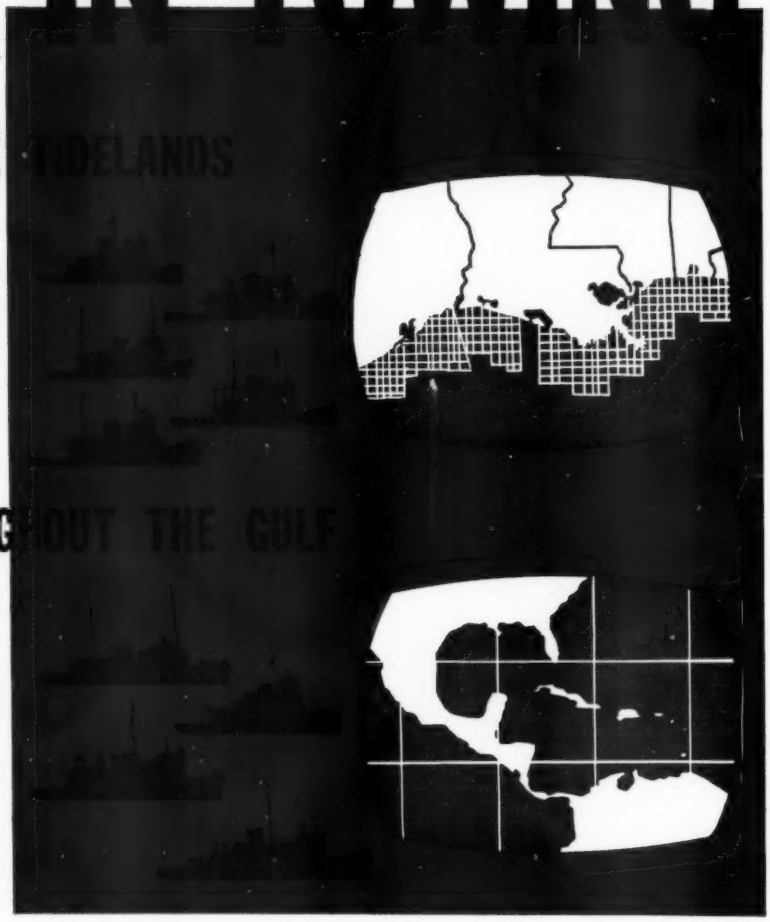

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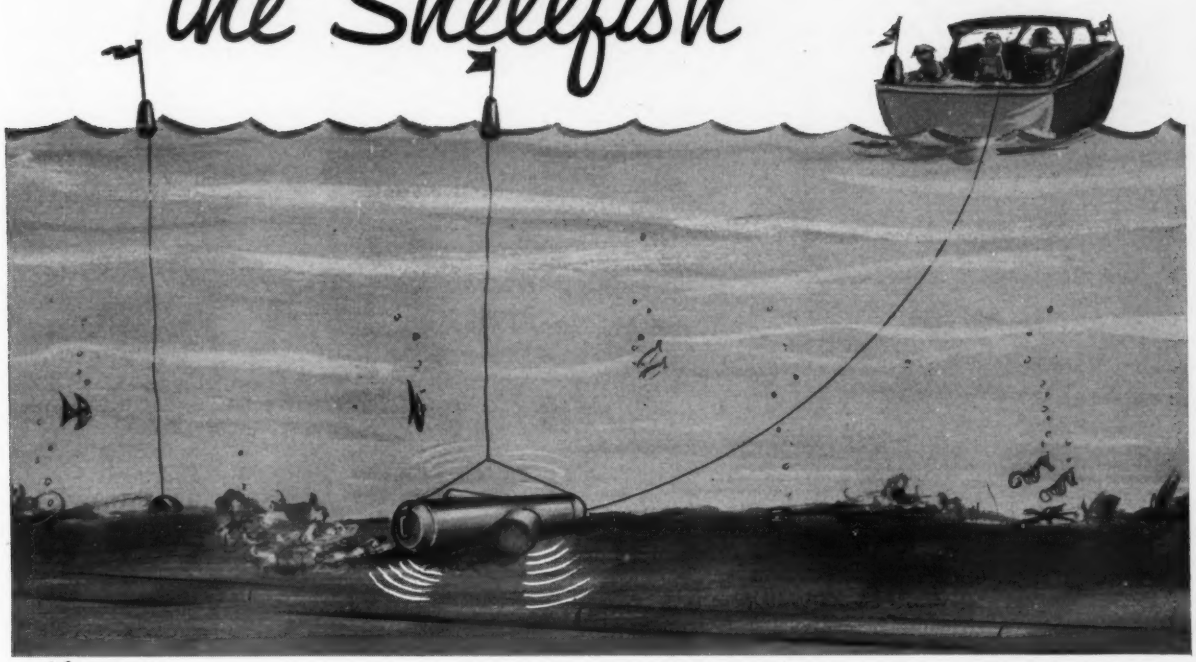

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Way offshore . . .

With the Publisher

A lot of folks fail to comprehend the size and scope of the marine oil industry—until they get a look-see at this annual issue of the offshoreman's oily rag, and suddenly realize the vast amount of activity that's going on all over the world.

In places like the Sea of Japan, the China Sea (off Borneo), Nigeria, Gabon, the Persian Gulf, the Red Sea, the North Sea, the Mediterranean, the Gulf of Paria, Lake Maracaibo, the Caribbean Sea, the Gulf of Mexico, the Great Lakes, the Pacific off Oregon, California and Peru, to name some of the principal areas of marine oil interest.

There's also a lot of confusion as to the definition of what's offshore. That's why we invented the phrase "the marine oil industry." For a rig doesn't have to drill in a sea or an ocean to make it a marine operation. There are a lot more inland marine drilling rigs in operation—in South Louisiana, for instance—than there are deepwater units. But whether it's a swamp location dredged out so a shallow-water barge can be floated in, or a platform location seventy miles from shore (as one is now), we cover the editorial waterfront to report on it for you.

As an example, you'll read an article in this issue about the upswing in new construction for the oil industry along the Gulf Coast. To illustrate the trend, we're reporting on two new rigs for the first time in this column—which is always a last minute chore. But a new platform rig and a new mobile drilling unit were announced after the magazine was put together, so we're just throwing in a note here and saying you'll be reading about both soon in our next (September) issue which is upcoming.

Meantime we'd better throw this copy at the printer, or even that much won't get in the issue. So we'll just slug it "13 ems, 10 garamond," which is the way the printer sets it, and let our trusty writing machine cool off until we . . .

See you next month!

Long John Latham

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Owners and operators of the largest fleet of deepwater mobile drilling units in the world, **The Offshore Company** pioneered in developing the Self-Elevating Mobile Platform. Rig 58, shown here en route to a location in the Caribbean, is a platform of this type which was designed for use with a tender vessel. Rig 59, a sister unit, has been placed in service drilling in South Atlantic waters off the coast of Africa.

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UNUSUAL OFFSHORE FACILITY is this mobile underwater oil storage unit, launched last March and now on its first location off the Louisiana coast. Offshore oil exploration had its beginning off the U.S. Gulf Coast, where the bulk of activity in the "American Sea" remains concentrated.

WORLD-WIDE MARINE OIL ROUND-UP

THE AMERICAN SEA

OFF THE U.S. GULF COAST--A LAST GREAT OIL PROVINCE

The tide of nationalistic fervor that is sweeping Africa, and roiling the future of the international oil industry in the Middle East, is making itself felt, to a lesser degree, in the islands and nations to the south of us that border the American Sea.

When the term "American Sea" was invented by the editors of Offshore in 1956, it seemed particularly appropriate for describing the broad reaches of the gulf and the sea to the south of us.

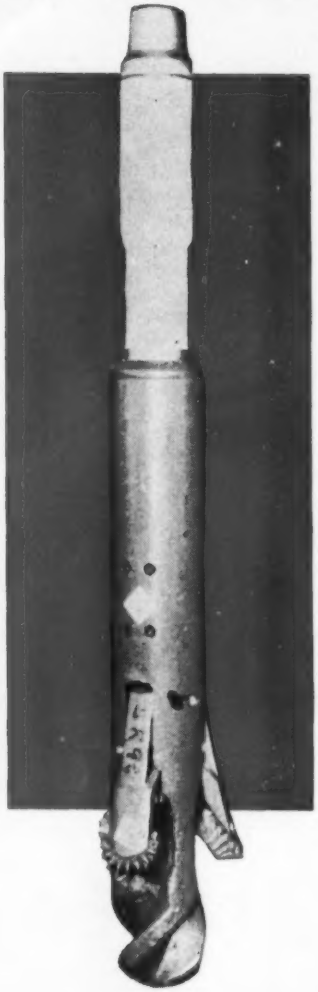
This gulf and sea—the Gulf of Mexico and the Caribbean Sea—are convenient to the shipping centers along the U.S. Gulf Coast that have become the base of operations for the major portion of the world's marine drilling fleet.

Some 300 inland marine and offshore drilling rigs are concentrated in the Texas-Louisiana area alone. Techniques and innovations developed here would be invaluable in developing the oil potential of other submerged areas within the American Sea.

For inside the 600-ft. mark, and within reach of the drill bit, are vast submerged areas off Flordia, Alabama, Mississippi, Louisiana, Texas, Mexico, Guatemala, Honduras, Nicaragua, Costa Rica, Panama, Colombia and Venezuela that hold prolific promise. Along the chain of islands stretching

Ours is a Republic, not a Democracy,
LET'S KEEP IT THAT WAY!

ROTARY OIL TOOL COMPANY "LOCKOMATIC" EXPANDING HOLE-OPENER



ELIMINATE PROBLEMS, WITH THE ROTARY "LOCKOMATIC" HOLE-OPENER–

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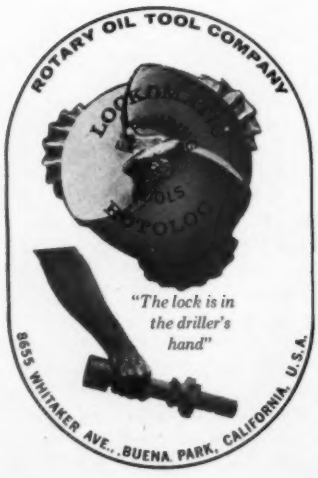

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from Florida to Trinidad are broad shelves and subsea pinnacles that may hold immense subterranean wealth.

In all, this vast domain contains some 300 million submerged acres in water depths less than 600-ft.—yet only the 35 million acres lying off Texas and Louisiana have been more than sparsely explored.

One sizeable field has been discovered in the Gulf of Campeche, off the coast of Mexico. There is activity on the Trinidad side of the Gulf of Paria—and the island badly needs new offshore reserves, to make up for declining production on land. Strikes have been made on the Venezuelan side of the Gulf of Paria, but overall activity has been curtailed drastically without any indication of resumption. A new tender-mobile drilling platform combination is drilling off the coast of British Honduras.

But Venezuela's Lake Maracaibo, which attracted so much U.S. investment capital just four years ago, has lost a great deal of its fascination for the U.S. oilman. This is partly due to world market conditions and the problem of over-supply, but the political climate in Venezuela is changing. The oil industry in Venezuela finds its position less favorable, and its future prospects not nearly so bright as they seemed a scant four or five years ago.

Omens?

Perhaps. The U.S. has made the oil industry peculiarly its own. Equipment and techniques developed here have been used to find the Free World's major oil and gas fields. Both the inland marine drilling barge and the mobile offshore drilling platform are U.S. innovations. The U.S.S.R. is becoming a dangerous competitor on the world oil scene, but the fact remains that no one anywhere can match the American's ability or know-how when it comes to finding and producing oil.

The U.S. oil industry might remain the world's best—yet still find itself pushed out of more and more areas where year by year it becomes more difficult to operate. Cuba has proved that it can happen—right in our own back yard.

In this event, our portion of the American Sea—the curving segment of the U.S. continental shelf that stretches from the Florida Keys to Brownsville—could become infinitely more important to us than it is now.

For without doubt this submerged area contains the last truly great oil province within our national boundaries.

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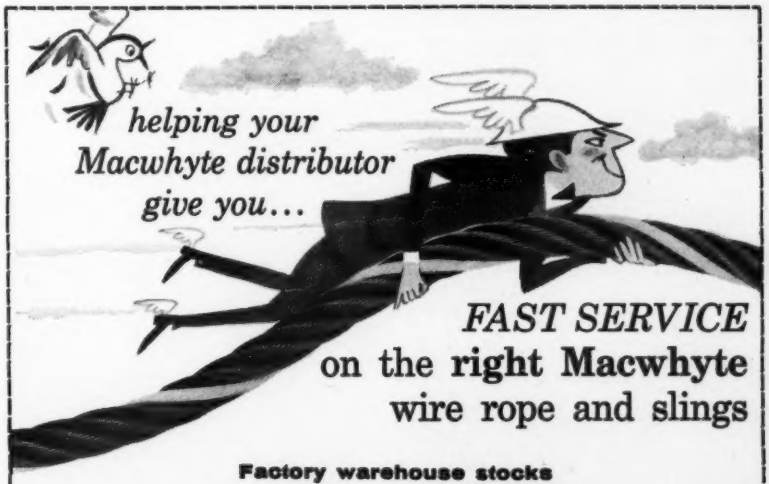

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TEST FOR NEW TECHNIQUE

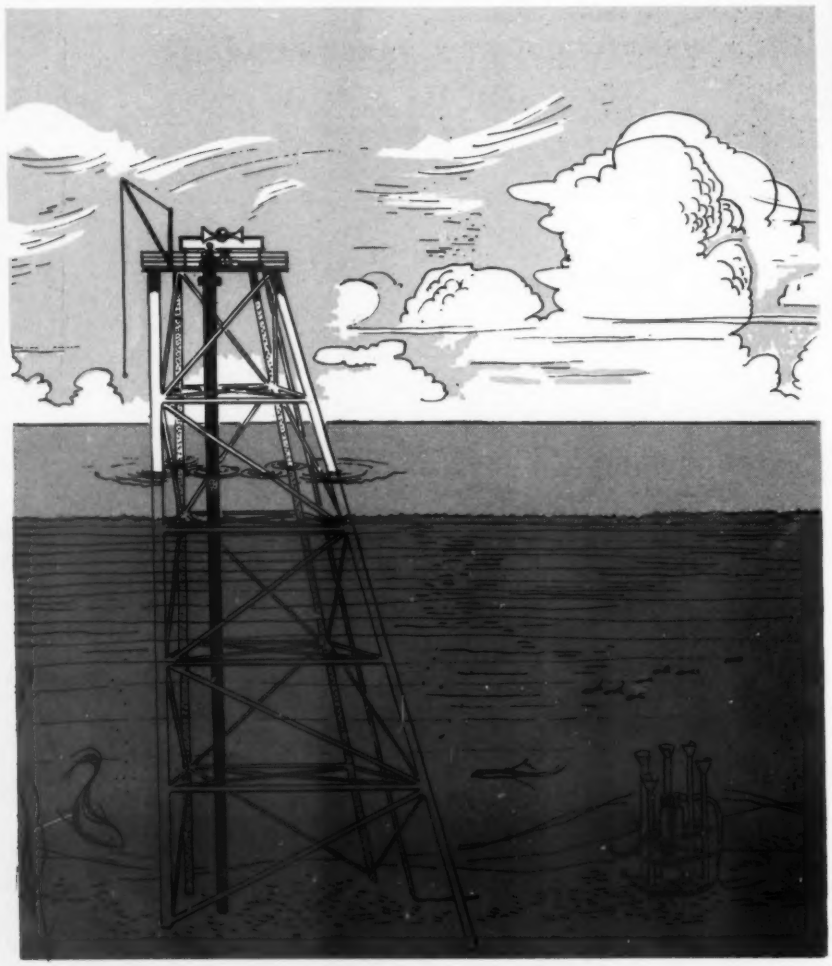
UNDERWATER COMPLETION FIRST FOR GULF

During the past twelve months, the industry has continued its determined efforts to lower the costs of both drilling for and producing oil offshore. A major contribution came early this year when Shell Oil Company announced the first underwater completion in the Gulf of Mexico.

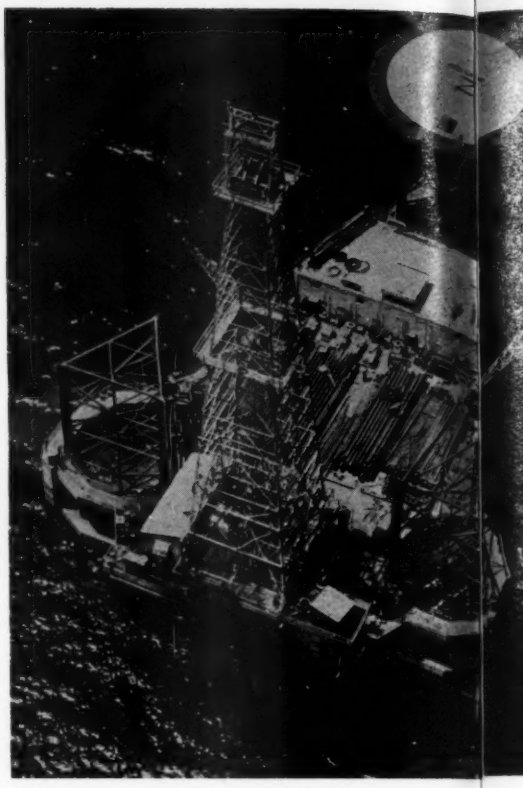
The history-making well, completed in 56-ft. of water late last December without the aid of divers, points the way to drilling and completing wells in much deeper water with greater economy.

Designated Shell OCS 407 No. 7, the well is located 35 miles off the coast of Louisiana in the West Cameron Block 192 Field. When made, it was the world's second underwater completion for a sea or ocean—the first was a well completed in 132-ft. of water in the Pacific off the coast of Peru, by Peruvian Pacific Petroleum Company.

Richfield Oil Corporation, a partner in Peruvian Pacific, has since completed a well in the Pacific off the coast of California some 50-ft. below the ocen's surace. Divers were used by both Peruvian Pacific and Richfield, but Shell's technique enables the wellhead equipment to be landed, and subsequent production operations to be performed, by remote control from the surface.



SHELL OIL COMPANY'S OCS 407 NO. 7 in the West Cameron Block 192 Field off the coast of Louisiana is the first underwater completion in the Gulf of Mexico. Artist's sketch shows wellhead equipment on the ocean bottom. Completion was made in 56-ft. of water without the aid of divers.



DRILLING AHEAD on Shell wildcat 31 miles off Galveston is Zapata Off-Shore Company's mobile drilling platform VINE-

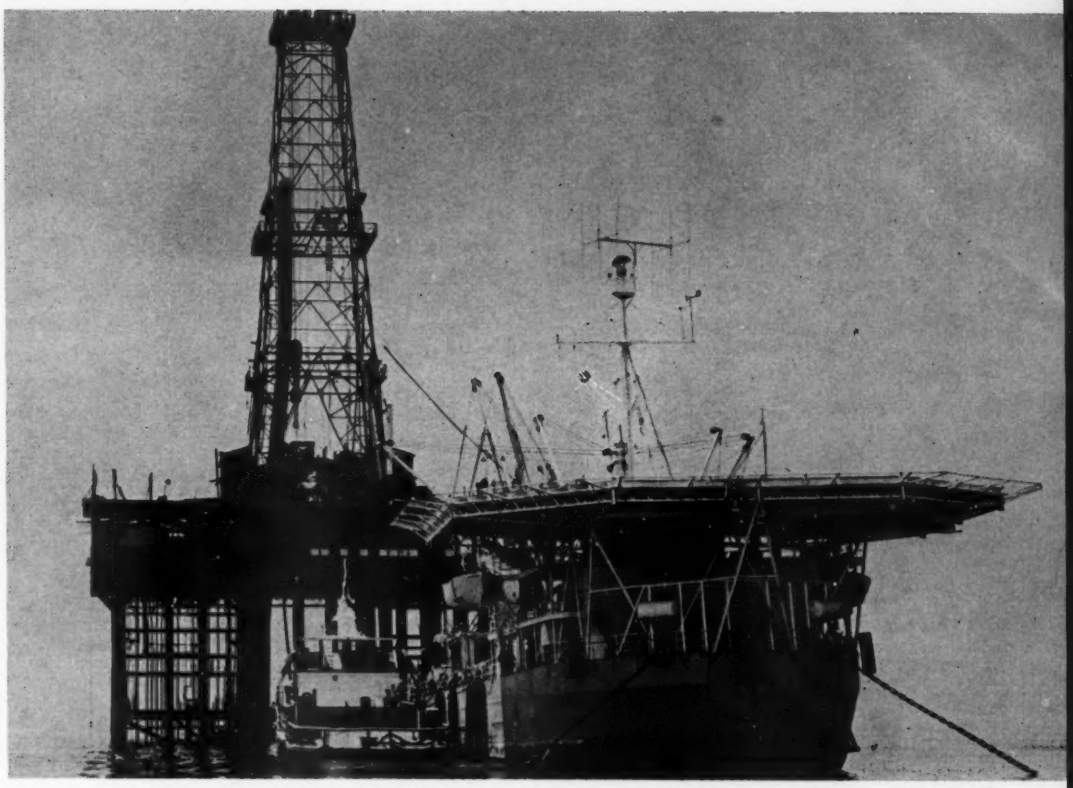
EMPHASIS UPON

"DOUBLE-DUTY" RIG AND

Late last year, Loffland Brothers Company reported that it was using two rigs on a single derrick to achieve unusual versatility in offshore drilling, and—more important—to effect a considerable saving for the operator in the cost of drilling and completing a series of wells from the same platform.

In the Bay Marchand operation (for The California Company), actual drilling was done by a heavy-duty rig, while a lighter rig utilizing the same derrick was used for completion and workovers. By using two rigs in the same derrick, Loffland could free its more expensive heavy-duty rig as soon as a hole had been put down, and let the lightweight rig take over for the completion or remedial work. The system proved more efficient for the contractor,

GARROON. But results of new exploration in the gulf off Texas have to date been disappointing.



TWO DRILLING RIGS in a single derrick is a feature of this offshore operation. Traveling blocks for both rigs can be seen in photo. Tender provides storage, living quarters for the crew, helicopter landing deck.

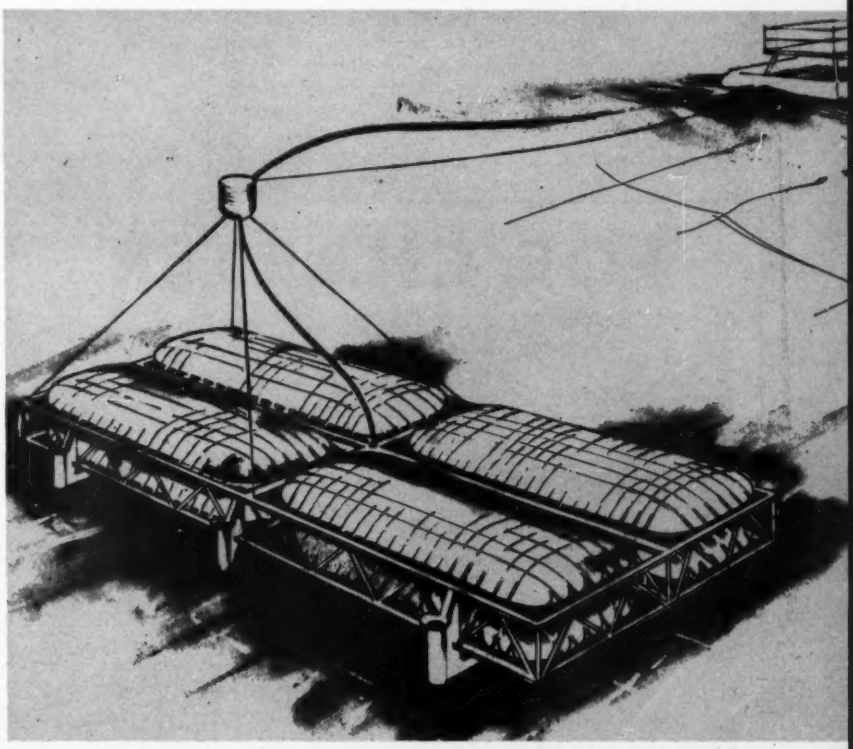
CUTTING COSTS

FLEXIBLE SUBSEA TANKS

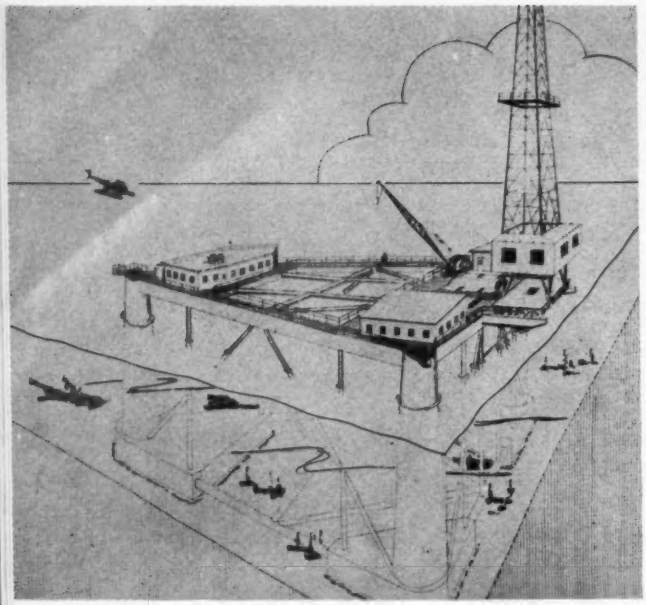
Loffland reported, while the producer gained through a more economic application of equipment.

Undersea storage . . . Flexible underwater storage (right) has been undergoing tests. The world's first installation took place in 54-ft. of water some 45 miles off Grand Isle, La. The trial unit was a 50,000-gal. capacity nylon reinforced rubber bag, laced to a rigid steel frame with nylon webbing.

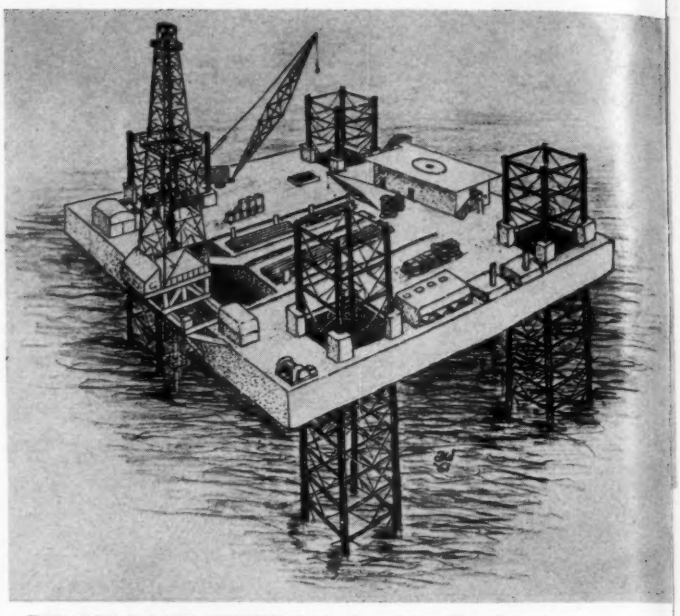
Indications are that use of this type unit could allow operators to open up a number of shut-in wells, wells located on the fringe of fields, or single wells in new fields too scattered for economic pipeline connections. Developed by Hanna Construction Company of Houston, Texas, the flexible underwater storage system is still under study.



THIS 400,000-GAL. UNDERWATER STORAGE SYSTEM was designed for use by a major offshore oil operator in the Gulf of Mexico. A smaller pilot unit has been tested at a location 45 miles offshore from Grand Isle, La. The installation, in 54-ft. of water, was the world's first.



NEW DRILLING DEVICE announced by Kerr-McGee Oil Industries, Inc. will operate in water depths up to 175-ft., cost approximately $7 million to construct.



RIG FOR 200-FT. WATER is designed to allow legs to be extended, permitting operation in water 250-ft. deep. One of many new designs under study.

NEW CONSTRUCTION UP ON GULF COAST

BIGGER, MORE EXPENSIVE DEEPWATER RIGS SPARK REVIVAL

From every indication—new construction of floating auxiliary craft such as crewboats and supply boats, specialized production equipment and deepwater drilling devices—the U.S. Gulf Coast is witnessing a revival in offshore construction that according to expert prediction should rise another 20 to 25 percent within a year.

Of special interest to the industry is the trend in mobile drilling units—to big, ultra-expensive rigs capable of operating beyond the present limits of 150-ft.

The largest unit planned, to date, is for operation in water depths up to 200-ft. But it is expected that units capable of operating in water depths up to 300-ft. will be available by the end of 1962 (*See "A Special Offshore Report," Offshore, p.* 11-16, *June,* 1961).

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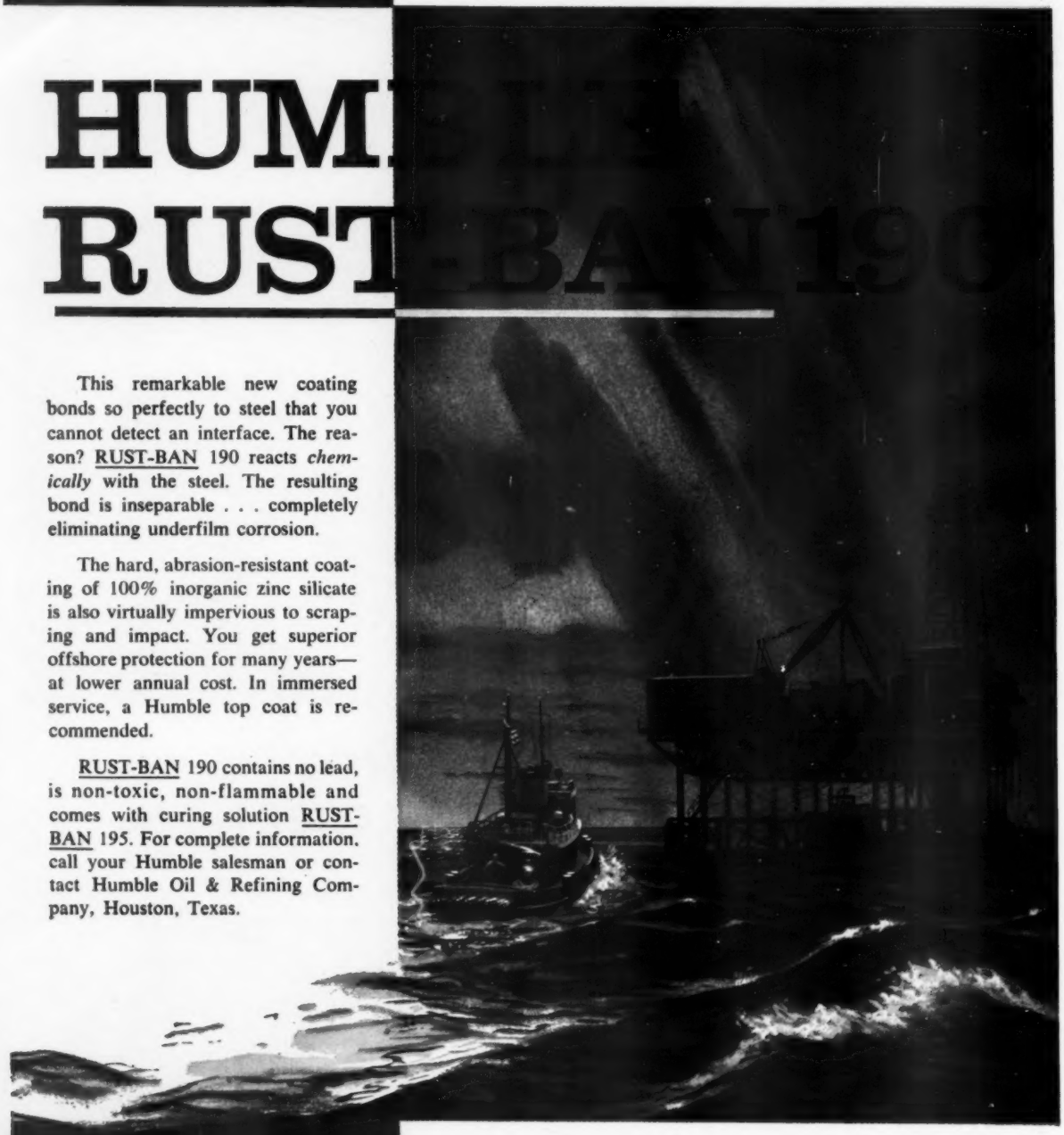

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Alaska

Slant-Drilled Gas Find Sparks Offshore Interest

The new state of Alaska has had several lease sales that included tidelands acreage, but offshore activity has been understandably slow to develop.

Standard Oil Company of California, Western Operations, Inc., has now completed a gas strike that should spark interest in Alaska's offshore potential.

As operator for itself and Richfield Oil Corporation, Standard completed its Falls Creek Unit No. 1, Section 6, T-i-N, R-12-W, S.M., as a new gas field discovery. The exploratory well, located in the Clam Gulch area of the southern Kenai Peninsula, was directionally drilled from an onshore location so as to bottom on a state offshore lease jointly owned by Standard and Richfield.

The well was drilled to 13,795-ft., and completed at 7,600-ft. with a potential of approximately 1,950 mcf of dry gas per day.

Oregon

Gulf, Shell Ask Permit For Offshore Exploration

Gulf Oil Corporation and Shell Oil Company have both applied for permits to do preliminary exploration work in Oregon's offshore waters.

The action follows the pasing of a new leasing law by the state legislature. Under this law, the preliminary exploration work could include seismic and gravitymeter surveys, as well as core-drilling to 500-ft.

But the law had not been signed by Oregon's Governor Mark Hatfield, at last report, and a valid permit could not be issued to either company until the law was put into effect.

Oregon has not held an offshore lease sale, to date.

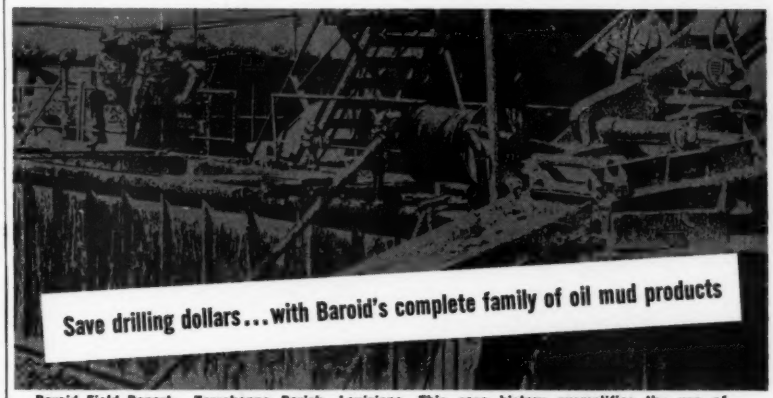
Bahamas

Dormant Since Cay Sal Test Abandoned In '59

There has been no offshore activity in the Bahamas area since the Bahama Oil Company and Bahama Gulf Oil Company abandoned their ultra-expensive Cay Sal 4-1 two years ago as dry.

The $3 million test was drilled by Zapata Off-Shore Company of Houston, using the mobile unit Scorpion. Location was on Cay Sal Bank, some 135 miles south of Miami and 180 miles southwest of Nassau. The try went to 18,906-ft.—one of the deepest offshore wells ever drilled anywhere.

Bahama California Oil is a subsidiary of Standard Oil Company of California, and Bahama Gulf is a subsidiary of Gulf Oil Corporation.



Baroid Field Report: Terrebonne Parish, Louisiana. This case history exemplifies the use of one type of Baroid Oil Mud to solve this particular problem.

Baroid Oil Mud solves deep drilling problem (BHT 300 F)

In a recently completed well in the Hollywood Field, Terrebonne Parish, Louisiana, a Baroid Oil Mud containing INVERMUL*, DURATONE** and PETROTONE* was used as the practical solution to the problem of drilling a 5¾ inch hole at depths to 16,500 feet and temperatures to 300 F.

Tight-hole conditions had been experienced while drilling to 15,000 feet and a 7 inch OD liner to be set (in 8¾ inch hole) at this depth was stuck at 14,327 feet. A Baroid Oil Mud was selected to drill the bottom 1,470 feet of hole because of the excellent control of flow properties, hole stability and lubrication that would be attained. API filtration could be held at zero, filtration at anticipated bottom-hole temperature of 275 F to 300 F could be easily controlled, and flow properties comparable to water-base muds could be achieved.

At 14,327 feet the water mud in the hole was displaced with approximately 1,500 barrels of pre-mixed 17.5 ppg Baroid Oil Mud. The 7 inch liner was cemented, cement was drilled, and reaming to bottom was begun. While reaming to bottom, the water mud (about 5% of total mud volume) was incorporated into the Baroid Oil Mud with no difficulty.

The 5¾ inch hole was drilled from 15,100 to 16,570 feet at about the same penetration rates normally attained with water muds. Periodic additions of diesel oil, INVERMUL emulsifier and DURATONE filtration control agent maintained the excellent filtration and flow properties of the oil mud. Drilling was trouble-free and a 4½ inch OD liner was successfully set at 16,570 feet.

PETROTONE was used to treat this oil mud to eliminate the possibility of any settling of BAROID* at the high bottom-hole temperature. DURATONE controlled filtration at zero API.

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*INVERMUL, emulsifier; PETROTONE, suspending agent; and BAROID, weight material; are Registered Trademarks of Baroid Division National Lead Company.
**DURATONE, filtration stabilizer, is a Trademark of Baroid Division National Lead Company.

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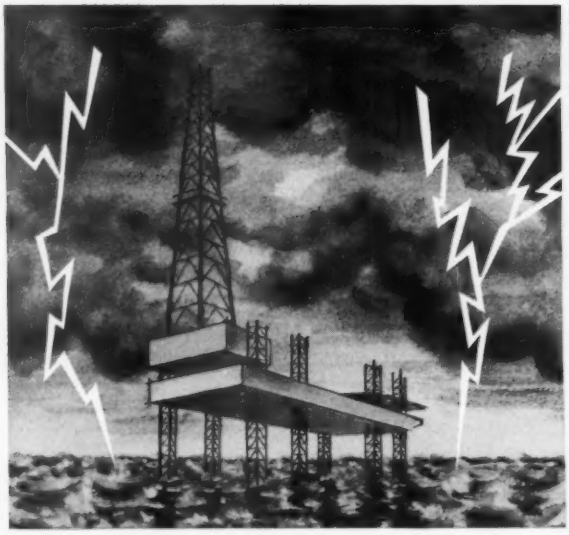

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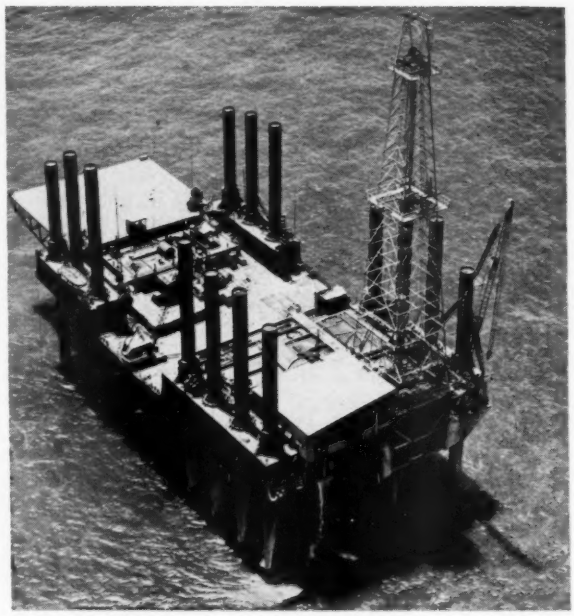

THE OFFSHORE COMPANY'S RIG 52 is back off the Florida Coast, drilling an offshore wildcat for Gulf Oil Corporation and The California Company.

NEW TRY FOR FLORIDA

GULF, CALCO DRILLING WILDCAT

Drilling is underway on a new wildcat test off the southwest coast of Florida. Teamed up on the venture are two companies—Gulf Oil Corporation and The California Company—who have already chalked up several unsuccessful tries in the sunny Florida waters.

Location of the No. 1 Marquesas OCS Block 46 is approximately 44 miles southwest of Key West. The well is being drilled in 55-60-ft. of water by The Offshore Company's **Rig 52,** a self-contained mobile drilling platform. Gulf is the operator, and is using Key West as a base.

The wildcat will be the third drilled by Gulf and Calco on the federal leases since they were acquired in August, 1959. Previous tests all resulted in dry holes. One of these—Gulf's 1 OCS Block 28—was also drilled by The Offshore Company's **Rig 52,** and abandoned as dry after reaching 15,294-ft.

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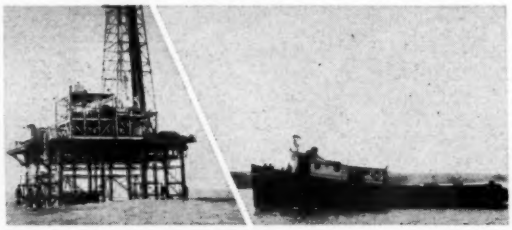

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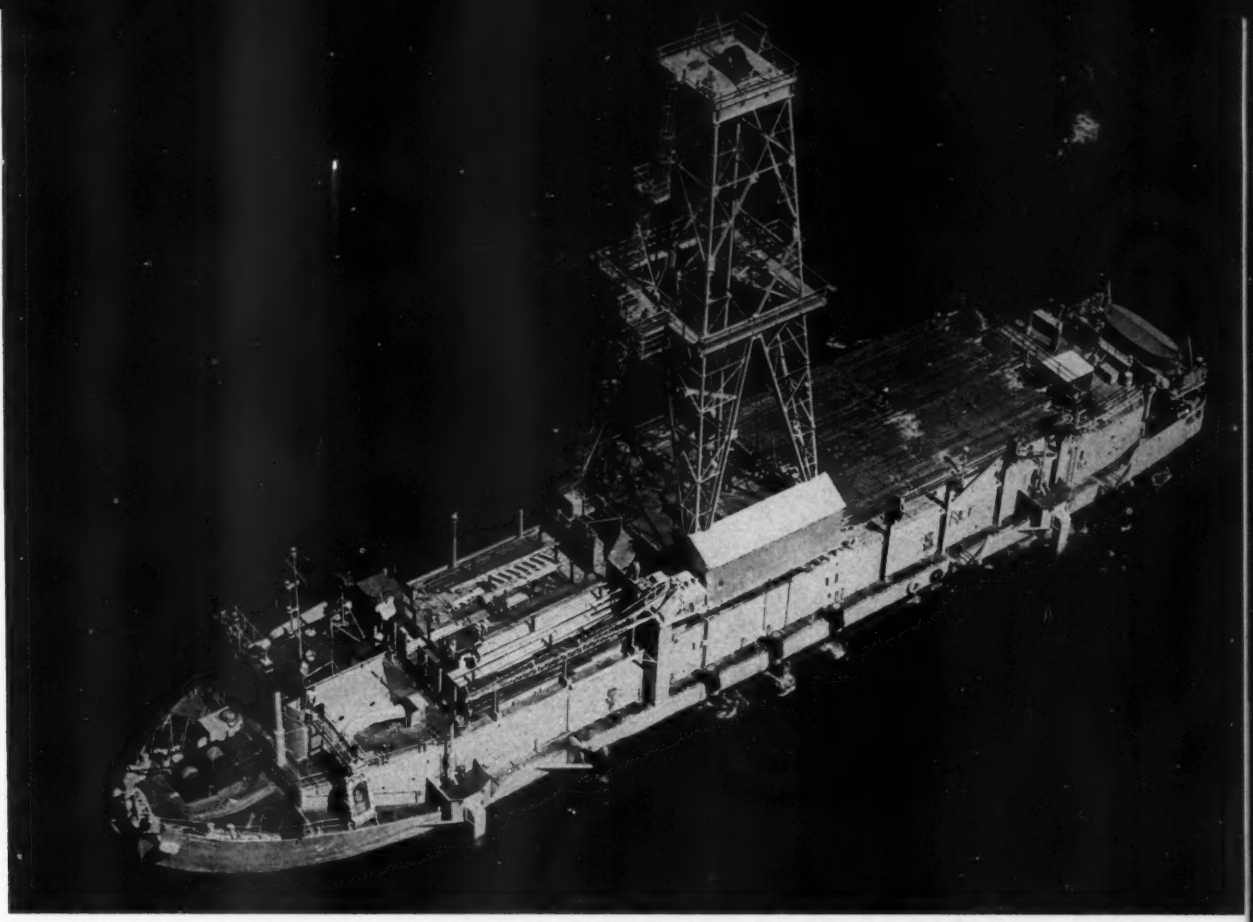


DRILLING VESSEL CUSS I, with over 13,000-ft. of high alloy drill pipe on its horizontal pipe racks, prepares to begin "Moholing" off Guadalupe Island. Note outboard motors fore and aft that held ship on location.

CALIFORNIA INDUSTRY SETS LIVELY PACE

GLOBAL MARINE'S DEEPWATER DRILLING IS "STORY OF YEAR"

California continues to make the industry's most exciting news with regard to deepwater drilling and underwater completions.

This is due, in part, to purely local considerations. The California tidelands presents a narrow target for the oil drill, at best, and slopes quickly into deep water. By comparison, the floor of the Gulf of Mexico slopes out so gently that in places off Louisiana and Texas an oil rig can set down nearly 100 miles at sea and still be in water only 100-ft. deep.

The California coastline where the state's offshore industry is concentrated is also a highly developed resort area. This has led to rigid restrictions on offshore drilling, as well as the construction of any kind of above-water production facilities. A few drilling islands and drilling-production platforms have been erected, but conditions have made underwater completion of oil and gas wells much more attractive to West Coast operators, and they have worked harder to solve the problem (see the next page).

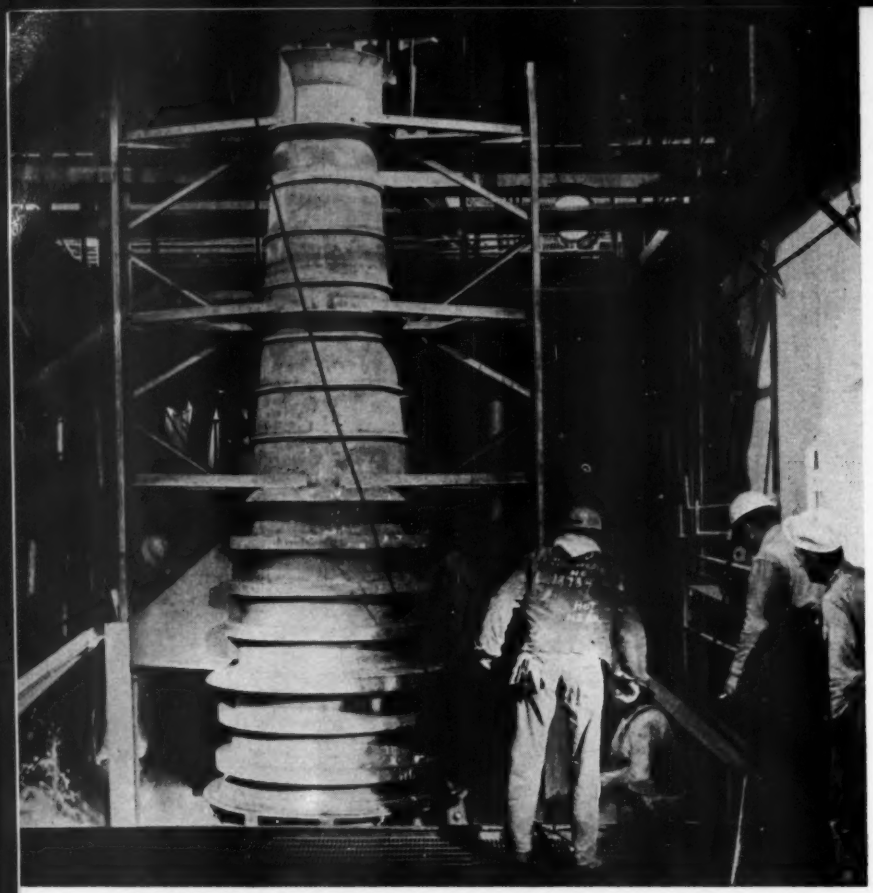
But it is in the field of deepwater drilling that the accomplishments of the West Coast operators have fired the imagination of the industry.

Prior to 1961, the deepest water in which anyone had drilled, anywhere in the world, was a series of core tests put down off the California coast in about 400-ft. of water. This drilling was done by the floating drilling vessel CUSS I, owned and operated by Global Marine Exploration Company of Los Angeles.

But early this year—using the same drilling ship—Global Marine shattered its own record so conclusively that the prior depth mark might as well never have existed.

The giant step that Global Marine took out into the ocean deeps was in connection with a project unrelated to finding oil, but making use of equipment and techniques developed by the oil industry. The project was the "Mohole," which had as its ultimate objective the drilling of a 15,000-ft. core hole into the Mohorovicic discontinuity beneath 18,000-ft. of water. As a preliminary to the actual drilling of the Mohole, Global Marine positioned the CUSS I in 3,000-ft. of water off La Jolla, Calif., and successfully drilled test holes into the ocean floor from an incredible half mile above the actual drillsite.

But this was only a first step—what was called "Part I" of Phase I" of the Mohole project, as it were. CUSS I had now drilled in water over seven times deeper than had ever been drilled in before, but even



LOWER PORTION of tubular guide shoe that distributed bending strain along the drill string aboard CUSS I. Section shown is lowered below grating and smaller upper portion connects to rotary table.

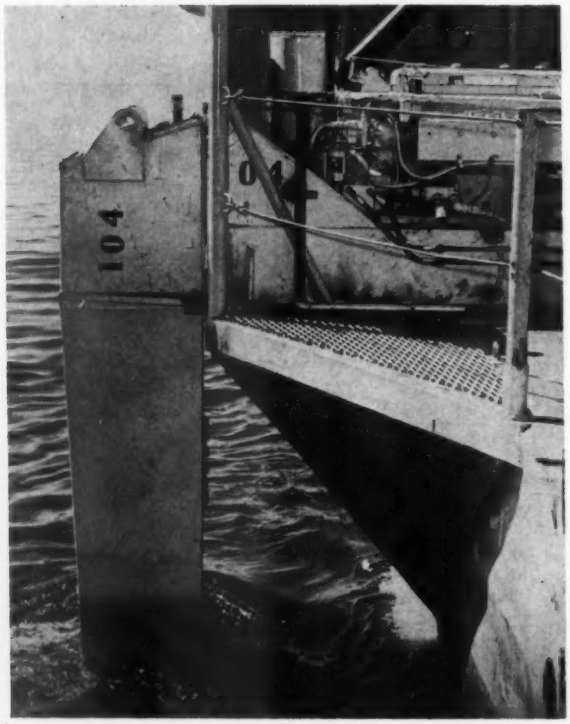
that astonishing record did not stand for long. Global Marine took the CUSS I, loaded with special gear, scientists and borrowed oil industry experts, to a location in 11,700-ft. of water in the open Pacific near the island of Guadalupe, off the coast of Baja, California.

There the history-making drilling ship punched five shallow test holes into the ocean floor from an incredible height of more than two miles above the unseen drillsite. The water was much too deep for the ship to ride at anchor—it was kept on location by outboard diesels that held it fairly close over the submerged location.

With this first phase of the Mohole project completed, the CUSS I was stripped of her special gear and is now back off the coast of California handling a more mundane chore—drilling for Standard Oil Company of California off Santa Barbara County in water a mere 235-ft. deep.

But the deepwater drilling feats performed by the historic vessel is the offshore story of the year.

Global Marine and the CUSS I have proved that oil exploration can be carried into much deeper water than was heretofore deemed possible —or practical.



ONE OF FOUR OUTBOARDS that held the CUSS I in position during drilling operations in 11,700-ft. of water. A central control console enabled an ordinary seaman to keep the ship on location for drilling.

UNDERWATER COMPLETIONS ...MAKE CALIFORNIA NEWS

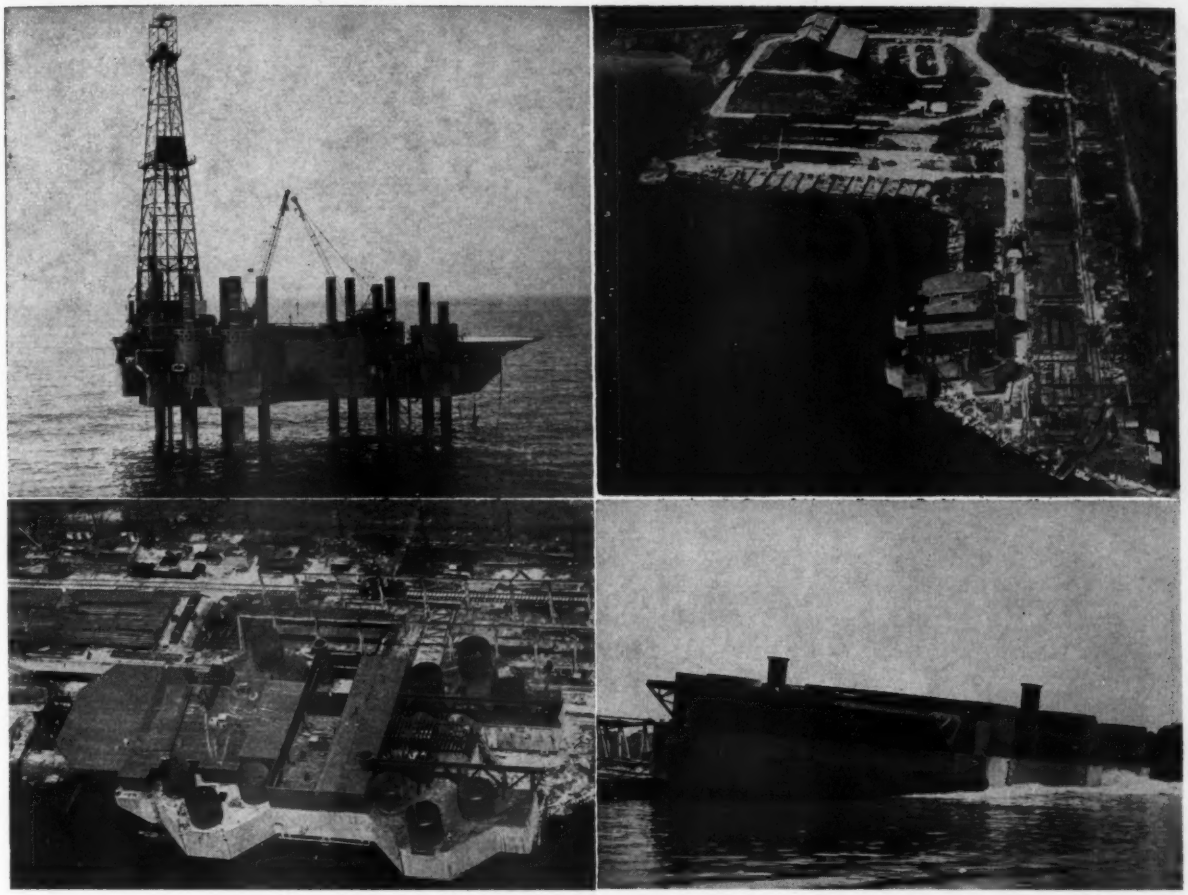
Richfield Oil Corporation recently announced an underwater completion on its offshore lease at Rincon, Ventura County, California.

The well, completed more than 50-ft. below the ocean's surface, was California's first. Site of the underwater completion is about .7 mile offshore and just north of the company's filled drilling island on the same lease.

Richfield has released only a bare announcement of the completion, but undoubtedly used approximately the same equipment and techniques developed by Peruvian Pacific Petroleum Company. Peruvian Pacific, a subsidiary of Cities Service in a joint venture with Richfield, earlier this year completed a well 132-ft. under the Pacific off the coast of Peru.

Richfield is planning a second underwater completion in water 207-ft. deep, off California's Coal Oil Point.

At the same time, Standard Oil Company of California, Western Operations, Inc., and Humble Oil & Refining Company plan a novel approach to underwater completions —with a wellhead 135-ft. above the ocean floor but still nearly 100-ft. below the surface of the water. If plans are carried out, two wells will be completed in this manner on the jointly-owned Parcel C off California's Santa Barbara County.



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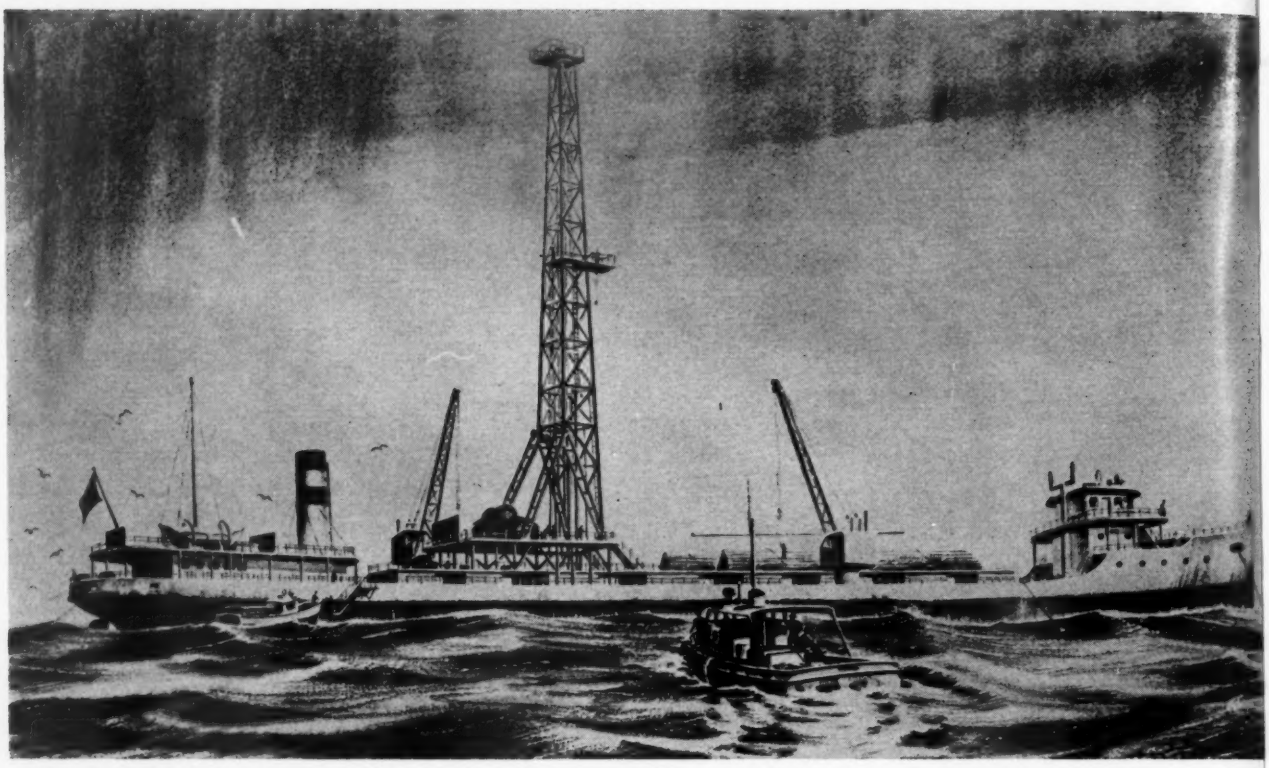


ARTIST'S CONCEPTION is of the Offshore C-1, first floating drilling vessel to operate in the Great Lakes area. The converted former grain carrier mounts a conventional rotary drilling rig—also unusual for the Great Lakes, where most drilling is done by the cable-tool method.

Marine oil round-up

ACTIVITY STEADY IN GREAT LAKES

50-WELL PROGRAM IS CONCENTRATED IN LAKE ERIE

Before snow falls soon to end the short drilling season in Lake Erie, some 50 offshore wells will have been punched into the floor of the shallow lake in a continuing search for gas. An estimated 300 wells have been drilled into the lake, to date.

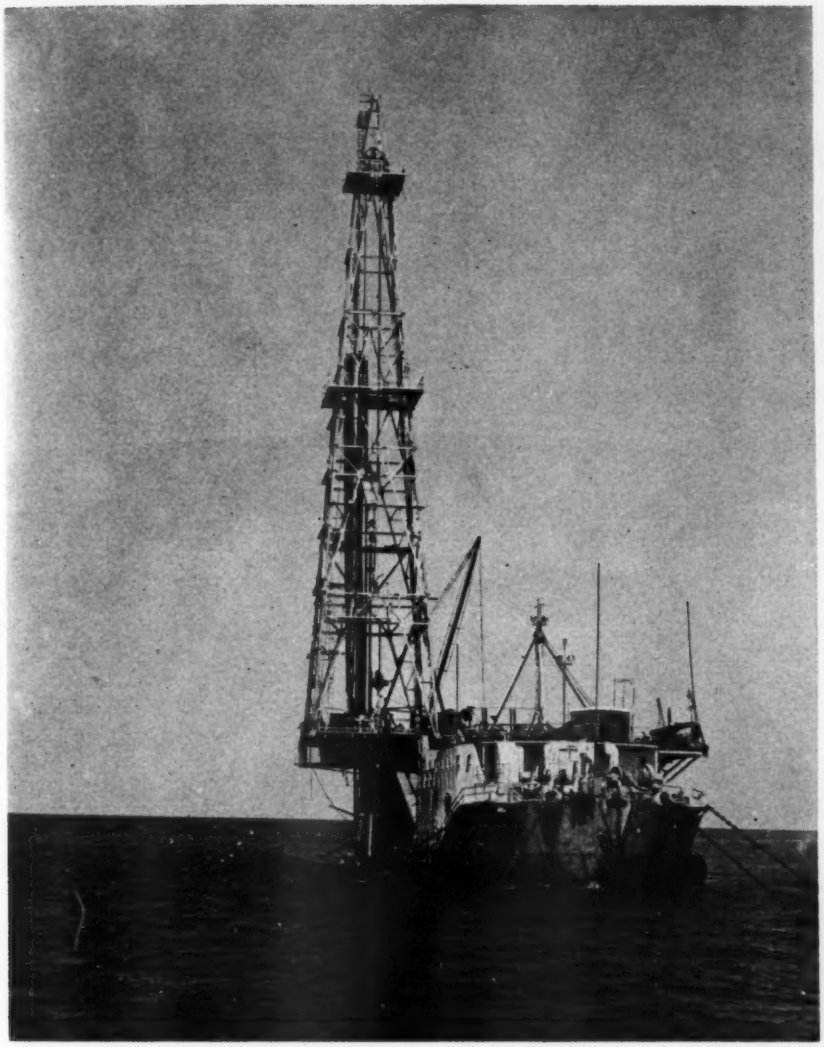
Wells in Lake Erie are not big producers. But the nearness to large population and market centers, and a very high price for the gas produced, has provided ample incentive for operators to continue offshore exploratory work. Most activity remains on the north, or Canadian side of the lake. Some oil has been found, but the primary target remains gas. Production is shallow, and drilling is usually done with cable tools mounted on either platforms or small mobile units.

However, one of the giants of the U.S. natural gas industry—El Paso Natural Gas Company—has joined the search with a floating drilling ship mounting a conventional rotary drilling rig.

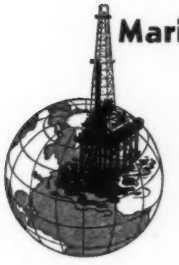
The **Offshore C-1**, first floating drilling vessel to operate on Lake Erie, is the former grain carrier **S.S. Simcoe.** Drilling equipment includes a 96-ft. jackknife derrick, drawworks powered by twin GM 6-71 diesel engines, and such auxiliaries as two 15-ton cranes for handling tubular goods and other supplies, and four air compressors.

The **Offshore C-1** is using air-drilling methods in its initial operations. Drilling is through a 15-foot-wide slot in the center of the vessel—a method used successfully both on the West Coast and in the Gulf of Paria.

Based at Port Colborne, Ont., the non-self-propelled **Offshore C-1** is towed to each drillsite, where anchors and winches stabilize it during drilling operations. A full-fledged ship, the **Offshore C-1** measures 252-ft. long by 46-ft. wide, with a draft of 15-16-ft. when loaded with drilling equipment and ballast.



DRILLING FOR CIMA off Mexico is Zapata Off-Shore Company's veteran floating drilling ship Nola 1.



Marine oil round-up

SEA HUNT OFF MEXICO

CONOCO BECOMES PAULEY PARTNER

Continental Oil Company recently purchased a half interest in Pauley Pan American Petroleum Company's offshore holdings in the Bay of Campeche, off Mexico.

For $8 million, Conoco became a partner in Mexico's only offshore field, although the nation's offshore potential is tremendous. Along the eastern coast of Mexico lies the largest unexplored marine oil region in the entire Gulf of Mexico.

Onshore production exists from Texas to the tip of the Yucatan Peninsula. The adjacent offshore region is a wide, sloping belt of submerged land extending down from the State of Quintana and bordering Campeche and Tabasco. West and north of the Yucatan Peninsula, it spreads into an enormous fan-shaped area. Here, on the Campeche Banks, it would be

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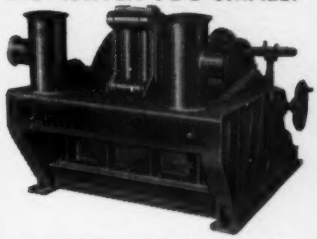

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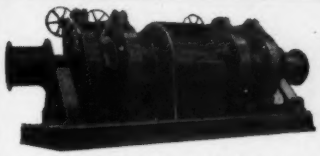

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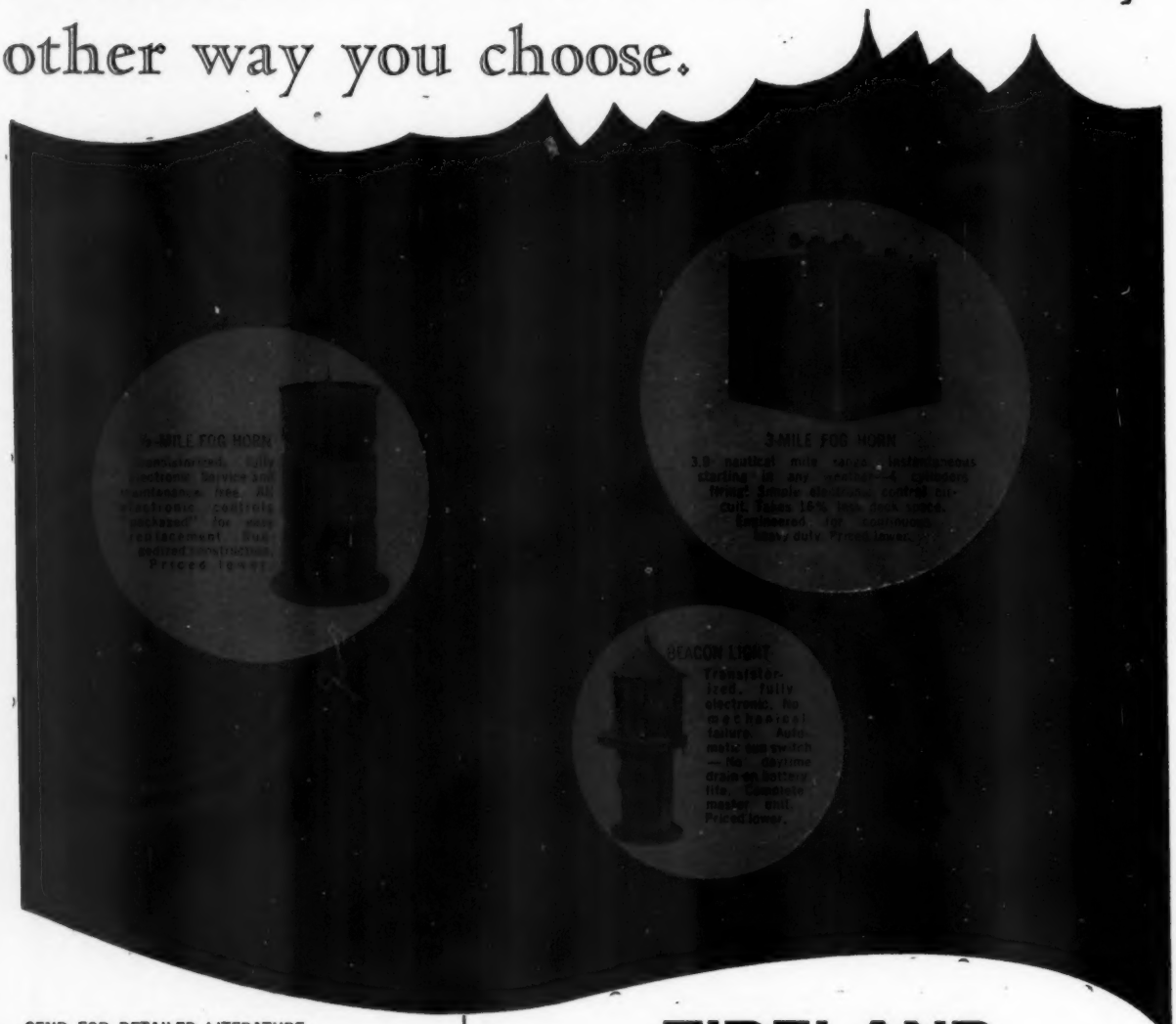

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possible to spot a marine drilling rig nearly 200 miles at sea and still be in water less than 600-ft. deep. Spotted on one of the numerous pinnacles that dot the floor of the Gulf in the area, the rig could be in relatively shallow water at almost the same distance from land.

Santa Ana . . . But offshore production, to date, has been confined to a narrow strip of tidelands in the Gulf of Campeche just off the coast of Tabasco. Here, in 1959, a major oil strike was made by Pauley Pan American Oil Company.

The Santa Ana field, just off the mainland, now has eight completed wells capable of producing some 10,000 bpd. Five of the wells are dual completions, two are triple completions, and one is a single completion.

Production is in excess of the capacity of the one existing pipeline, which can handle only 5,300 bpd. But a second pipeline, capable of delivering 35,000 bpd, is under construction.

Development plan . . . Initial drilling in the offshore field was done by mobile drilling units towed down from the U.S. Gulf Coast. But a 12-well permanent platform has been erected, and four wells completed from it. Two more permanent platforms will be added—one a 16-well platform, and the other of that size or larger.

In addition, Zapata Off-Shore Company's floating drilling vessel Nola 1 is drilling a series of stratigraphic tests on the concession.

While Conoco has purchased a half interest in the venture, Pauley Pan American will continue as operator on the concession under the original name CIMA.

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DRAMATIC PHOTOGRAPH shows only a small portion of the nearly 4,000 oil wells dotting the surface of Venezuela's Lake Maracaibo—a shallow, brackish body of water that overlies the most prolific oil-producing area in North or South

Marine oil round-up

MARVELOUS MARACAIBO REMAINS WORLD'S

BUT NEWCOMERS TO LAKE HAVE FOUND CRUDE HARD TO MOVE,

The Persian Gulf is surrounded by the most fabulous oil reserves known to exist beneath the surface of the earth, and may one day move to the front as an overwater oil producer.

But today that distinction belongs to a shallow, brackish body of water in a separate hemisphere and some ten thousand miles away—for Venezuela's Lake Maracaibo remains the most prolific overwater oil producing area in the world.

The lake has a maximum depth of 120-ft., and is about two-thirds the size of Lake Erie. It occupies the central portion of an intramontane basin on the north coast of Venezuela. Prolific oil production has been developed along the northeast shore and now extends out into the lake some 20 miles.

Roughly 4,000 wells dot the lake's surface, drilled to varying depths from 3,500 to more than 12,000-ft. Maximum production has exceeded 1.4 million bpd.

Daily production from the lake could be much larger. Principle concession holders are Creole, Shell

America. One company drilled 50 straight producers in the lake, each with average known reserves of 19.5 million barrels.

MOST PROLIFIC OVERWATER OIL PRODUCER

IN COMPETITIVE WORLD MARKETS, DEPRESSING ACTIVITY

and Mene Grande, but additional concessions were granted to seven new operators in the lake in 1956 and 1957, and substantial new production has been developed. Also, a new state-owned oil company has been formed, and given lake acreage adjoining proven production. Venezuelan Petroleum Corp (CVP) has already drilled one 4,000 bpd producer and has staked location for a second test—also offsetting a lake field developed by private interests.

But finding a market for this surplus crude has been a problem, and overall lake activity remains depressed. New operators, in particular, have been hard pressed to find an outlet for their lake crude, and have been forced to cut back production to only a portion of what each lease could produce. Drilling has slumped sharply.

And like every government everywhere, the government of Venezuela needs more and more revenue. The oil industry remains the most lucrative target for new taxes. In cautious analysis, the industry's position in Venezuela has deteriorated somewhat, but still remains favorable.

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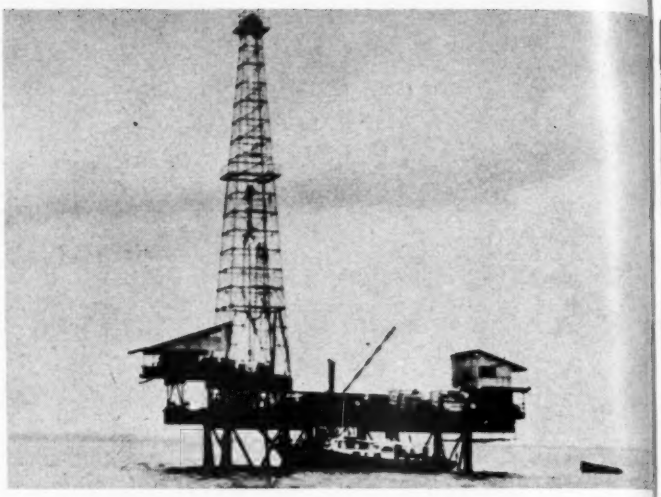
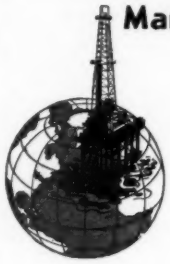


Marine oil round-up



OIL PLAY IN

MARINE DRILLING UP

Trinidad, in 1961, is looking to the submerged lands under surrounding seas to replenish dwindling reserves of oil within its palm-fringed shores.

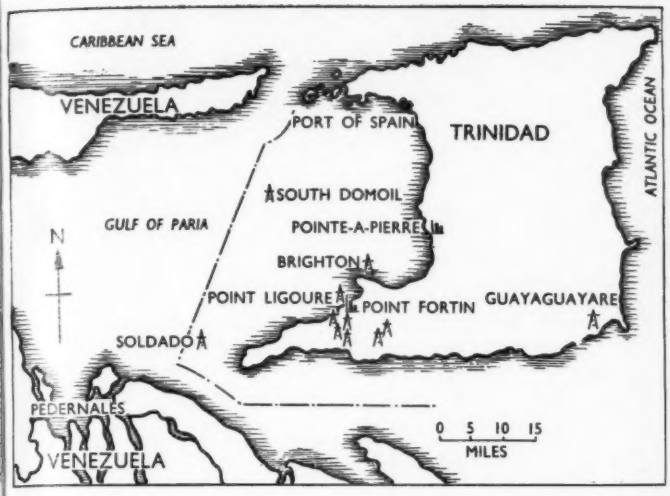
An oil producer since shortly after the turn of the century, it is becoming increasingly evident that the 2,000 sq. mile Caribbean island's future oil must come from offshore areas, and not the inland fields which dot its swamps and jungles, where production has been steadily declining.

A few figures will underscore the value of Trinidad's offshore oil. In 1960, cumulative production rose by more than one million bbls., or some 4,000 bpd above the 1959 level—a spectacular gain for the island's economy made in spite of a mid-year labor strike which put a considerable crimp in production.

This increase in production in 1960 was primarily attributable to an increased flow from the Soldado offshore field in the Gulf of Paria off the southwestern tip of the island.

Soldado . . . If marine drilling is the key to Trinidad's future oil supply, Soldado remains its outstanding offshore success. While the field is not big by some standards, it is outstanding for Trinidad, where the usual well on land would be considered marginal anywhere else in the world, at the very best.

Production at Soldado rose 50 percent in 1960, up from 14,000 to 21,000 bpd. Texaco Trinidad—as operator for itself, Shell and British Petroleum—drilled 25 wells in the field in 1960, of which only two were dry. Six wells were also drilled in an attempt to extend production both to the east and the west. Of these tests, three of the



TRINIDAD OFFSHORE

AS ONSHORE RESERVES DECLINE

four drilled to the west were producers, and one drilled on the east was a producer.

Brighton . . . On its own account, Texaco has continued development of the old Brighton field not far from Trinidad's famous Pitch Lake. The company drilled another 18 wells in 1960 from a multi-well platform located in shallow water about one and a half miles from shore. Of these 18 wells, two were dry and the remaining sixteen were producers well above the average for Trinidad as a whole.

In addition, Texaco drilled four successful marine step-out wells in the field with a mobile offshore drilling unit.

Texaco's first marine well in the field, drilled in 1958, was deviated out under the sea from an onshore location.

Domoil . . . Early in 1959 Dominion Oil completed Domoil 1 (see map) as a gas-condensate producer on the Trinidad side of the Gulf of Paria. An offset one-fourth mile to the south was also successful, and combined production from the two wells was nearly 3,000 bpd when first tested. However, the flow dropped sharply, with output from the field reaching only 212,861 bbls. in 1960. Two development wells were dry. Status of a third well is unreported.

Dominion (Standard of California) has been exploring in Trinidad for several years, both on land and at sea, and the Domoil field is to date its only commercial success.

Kern Trinidad . . . Between Brighton and Point Fortin, Kern Trinidad has drilled a number of deviated wells from shore out under its marine concession in Guapo Bay. In 1960 the operator drilled five wells on an offshore area of the Gulf of Paria using a floating drilling vessel towed down from the U.S. Gulf Coast.

Three of the wells drilled by Kern Trinidad were dry. A fourth was abandoned with stuck drillpipe after a blowout, and a fifth was completed as a producer. De-

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velopment work was then halted and the drilling vessel returned to the United States.

Trinidad Petroleum . . . Still another company, Trinidad Petroleum Development Company Ltd. (TPD) drilled a test well NM-2 in the Gulf of Paria, which came in at the relatively high rate of 1,000 bpd. But the well showed a very rapid decline and it is still uncertain whether the reservoir being tested will prove commercial. Three wells are planned for the same area during the latter half of 1961, with a further well staked off the south coast.

A drilling barge may be used for this work.

Big concession . . . A newcomer to Trinidad's offshore scene is the combine of Pan American International, Pure Oil Company and Sun Oil Company, awarded a 3,120 sq. mile concession in the Atlantic to the east and south of the island.

The concession covers an area bigger than Trinidad itself, and lies beyond the 3-mile limit in water depths varying from about 50-ft. to as much as 600-ft. The southern boundary of the concession is the international border between Trinidad and Venezuela.

Pan American is operator on the huge offshore concession, and some exploration work is expected to get underway this year.

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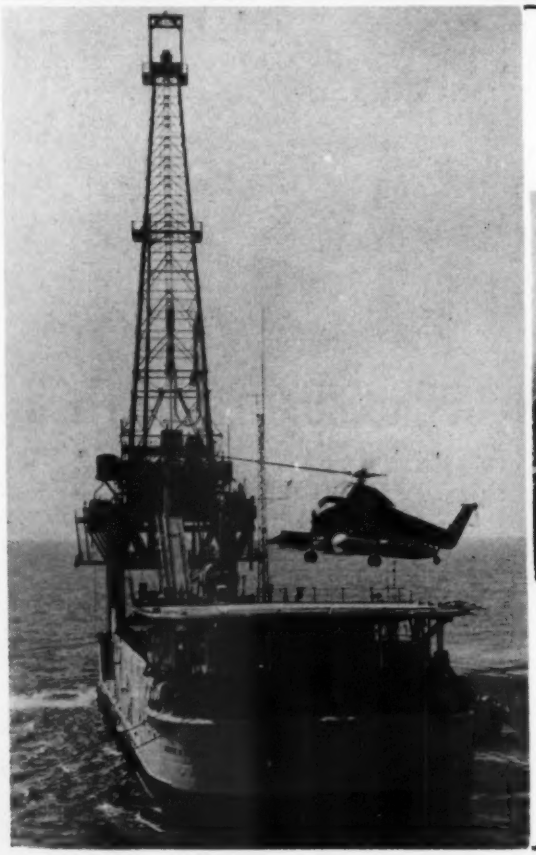

COST CUTTING 'COPTER
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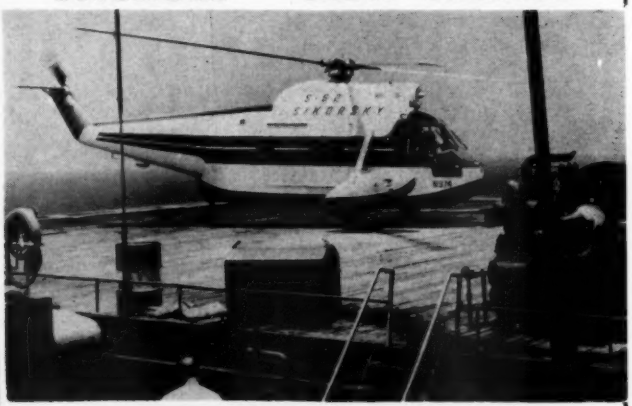

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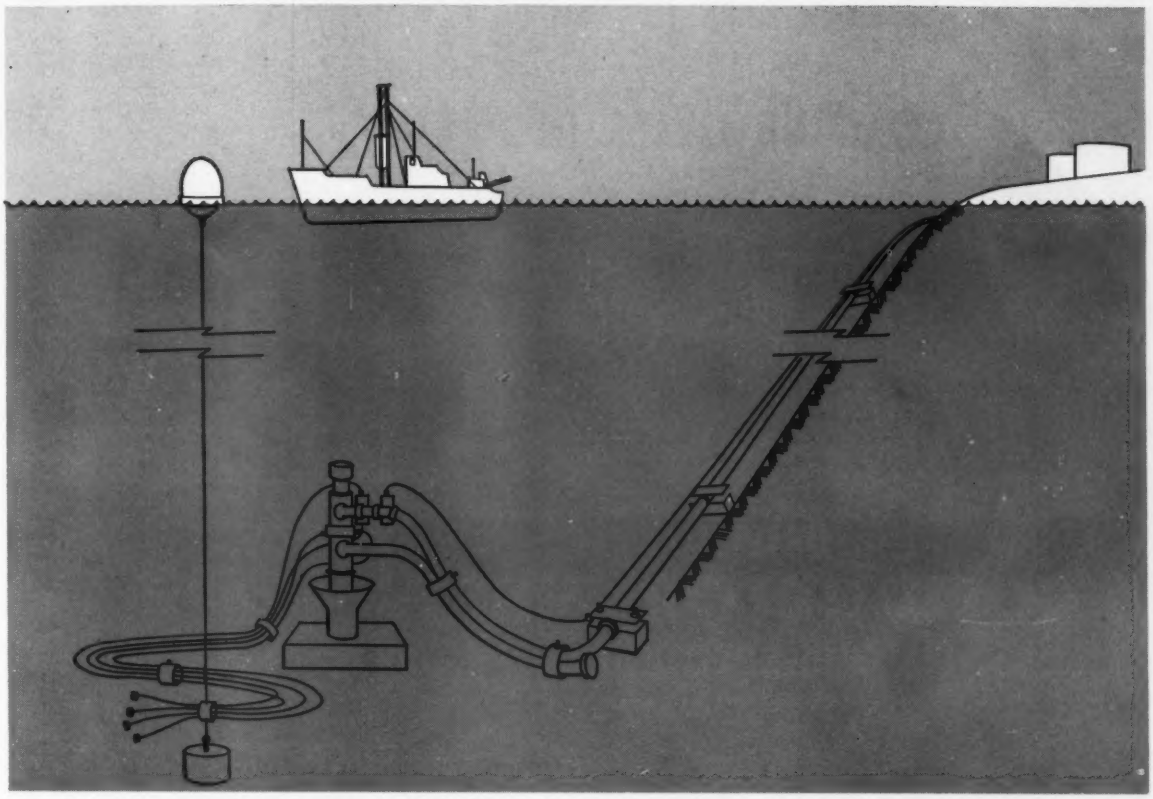

FIRST OCEAN FLOOR WELLHEAD is depicted in artist's drawing. Hoses on left, tied to buoy, are control hoses used in bringing the well into production from the drilling barge. They are left plugged on the ocean floor to be used in case remedial work is required. Plugged line tied to the oil line that runs to shore is installed for possible later use in artificially lifting oil from reservoir. Top of wellhead is 12-ft. off ocean floor.

Marine oil round-up

AN HISTORIC FIRST FOR PERU

HUMBOLDT 3-3 IS FIRST OCEAN-FLOOR COMPLETION

When the Humboldt 3-3 came in late in 1960 flowing 200 bpd from a wellhead submerged 132-ft. under the Pacific off the northern coast of Peru, Peruvian Pacific Petroleum Company had achieved a historic first for the oil industry.

Humboldt 3-3 was the world's first successful underwater completion in the open sea.

Location is 6200-ft. offshore from Cabo Blanco. The well was drilled and completed from the floating drilling vessel **Rincon** by Peruvian Pacific, a subsidiary of Cities Service Company in a joint venture with Richfield Oil Corporation.

Richfield has since used approximately the same equipment and techniques to complete a well underwater off the California coast.

Depth of the Humboldt 3-3 is approximately 1,000-ft. Brief tests of oil zones encountered in earlier test wells indicated substantial production, but Peruvian Pacific decided that the pool could not be economically produced from a platform at that depth, since wells could not be slanted far enough out in such a short vertical distance. Thus, the company had to come up with a cheaper way of developing the field —or walk away from a discovery.

The result was the industry's first ocean-floor completion, decided upon as the only economical method of producing Peru's only offshore oilfield.

ALUMINUM PIPE was shipped recently from U.S. to Peru, will be used to lay additional undersea lines to wells offshore.

Marine oil round-up

COMBINE QUITS IN PARIA

AFTER 20 HOLES, $129 MILLION

While the Gulf of Paria remains Trinidad's best hope for finding more oil, drilling on the Venezuelan side of the gulf has been a distinct disappointment.

With little to show for its investment, Paria Operations, Inc. has suspended drilling on 154,239 acres in the Gulf of Paria for which it paid the Venezuelan government $101 million in cash bonuses in 1957.

Since then, another $28 million has been spent on exploration and development. Eight producers have been completed out of 20 holes drilled, but their potential is small and further development of the offshore block may be uneconomic. No plans have been announced for resumption of drilling operations.

The initial discovery, Posa 112-1 found oil in 1958 near the international boundary with Trinidad. It was located about 10 miles from Trinidad's Soldado offshore field.

Seven development wells were then drilled from a huge multi-well platform fabricated on the U.S. Gulf Coast and transported by barge to the Gulf of Paria concession. Six of the wells were rated small producers.

Drilling operations have been carried out over the concession using virtually every type of offshore equipment, including a floating drilling vessel.

Continental Oil Company, Texaco Inc. and Ohio Oil Company each hold a 25 percent interest in the concession; Cities Service has 16-2/3 percent; and Richfield has 8-1/3 percent.

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Netherlands

First Offshore Well In North Sea To Spud Soon

The Triton, a mobile offshore drilling platform now being outfitted in Rotterdam, is expected to spud in a wildcat next month in the North Sea off the Dutch coast near Kijkduin.

It will be the first well drilled in the North Sea.

The well will be drilled by Nv. Nederlandse Aardolite Mij. (NAM), the joint Jersey Standard-Royal/-Dutch Shell operating company some two and one-half miles off the coast, and is projected to below 6,000-ft.

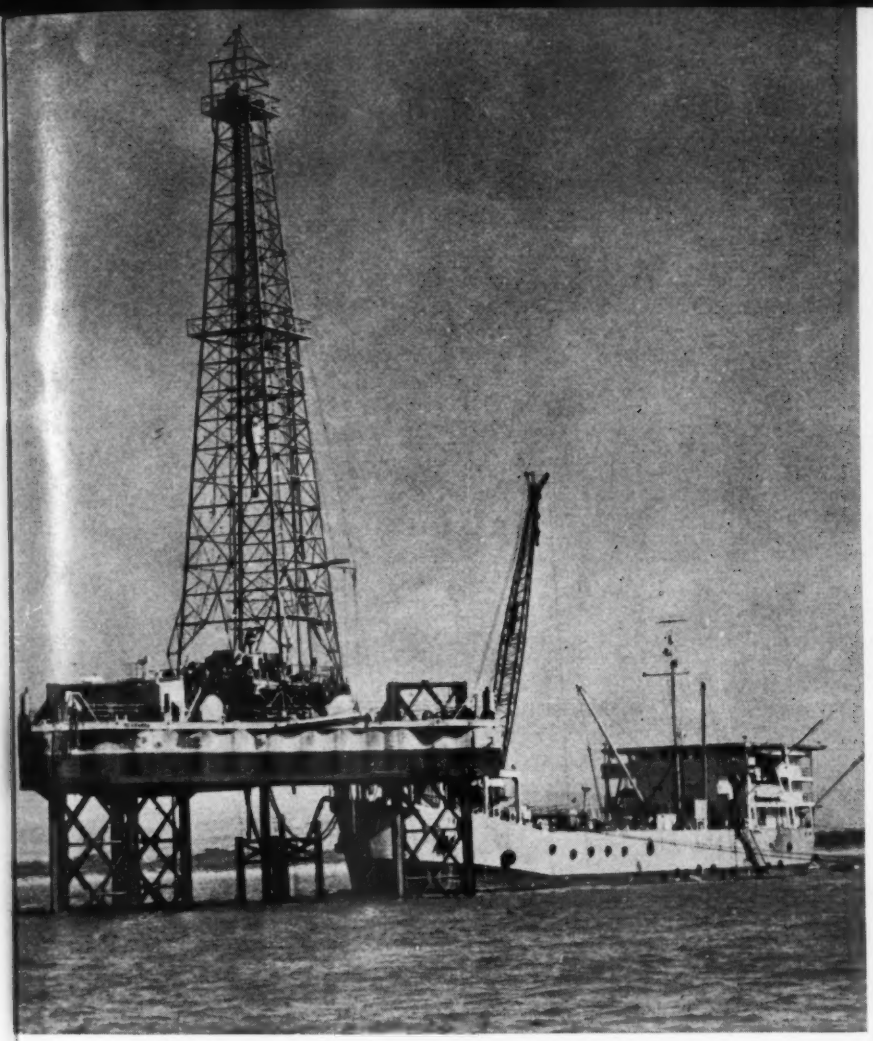
The Triton was built in the British Isles. Originally intended for use in the Far East, it was towed to Holland instead, for that country's first offshore test.

U.S.S.R.

Offshore Discovery Reported In Caspian Opposite Baku

An offshore discovery in the Caspian Sea opposite Baku has been reported. The Soviets have an immense overwater oil-producing installation at Baku, one of the nation's most important oil-producing areas.

A U. S. oil magazine reports that five additional wells will be drilled in the vicinity of the discovery, which is said to be about 1/3 mile offshore from Cheleken Peninsula.



SHOWN ON LOCATION OFF SICILY, where it drilled Europe's first offshore oil well, the mobile unit "Scarabeo" is now in the Gulf of Suez where it has made a discovery for Cie. Orientale des Petroles in the vicinity of Belayim Bay.

Marine oil round-up

DRILLING OFF EGYPT

STRIKE MADE IN GULF OF SUEZ

Cie. Orientale des Petroles d'Egypt, drilling with the mobile unit **Scarabeo** in Egypt's Gulf of Suez, recently reported an oil strike on its first offshore try in that country.

Location of the successful wildcat is a few miles off Belayim Bay on a concession held by Cie. Orientale des Petroles (COPE). The company is owned by International Egyptian, which in turn is controlled by Italy's ENI, Belgium's Petrofina, and the government of Egypt.

Drilling contractor on the job is SAIPEM, subsidiary of ENI. The mobile unit **Scarabeo**—built in the U.S. but used last in Sicily—was towed out from Italy for the job.

First pay was encountered at 7,850-ft., and reportedly flowed at the rate of 1,900 bpd. Production was nearly doubled by flow from a second sand encountered below 9,000-ft.

Cie. Orientale des Petroles has established considerable production at Wadi Feiran, Belayim, Abu Rudeis and Ekma. Most of the producing structure is believed to lie offshore, however. In addition to the offshore well drilled by the **Scarabeo**, a number of deviated wells have been drilled under the sea bed.

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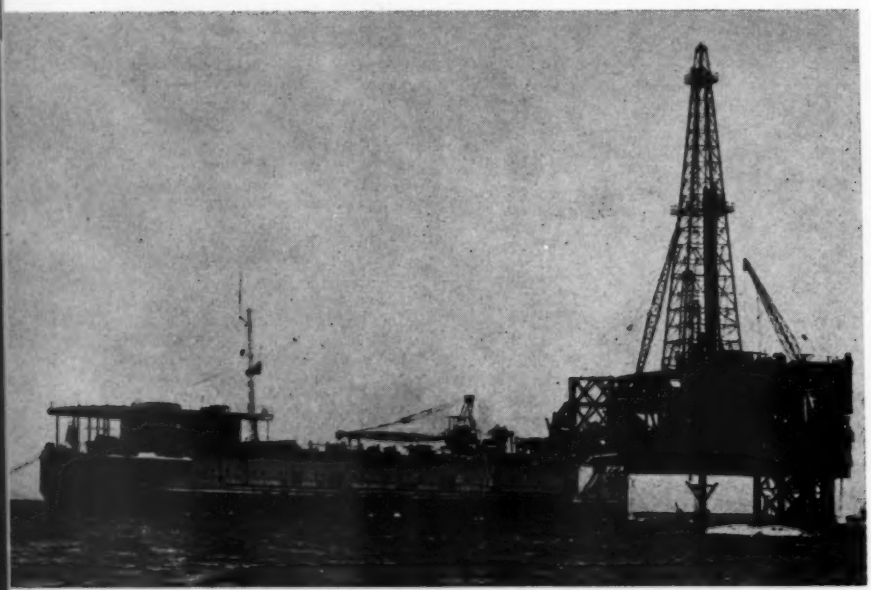
THE SELF-PROPELLED "PANINTOIL NO. 1," shown standing by in the Persian Gulf after a 10,500 mile trip from Texas, is just one of several U.S. rigs now at work on various international concessions in the oil-rich gulf. Iran Pan American is using the tender to support a platform drilling operation.

Marine oil round-up

BIG OFFSHORE STRIKES CONTINUE

SURROUNDED BY THE WORLD'S GREATEST PROVEN RESERVES,



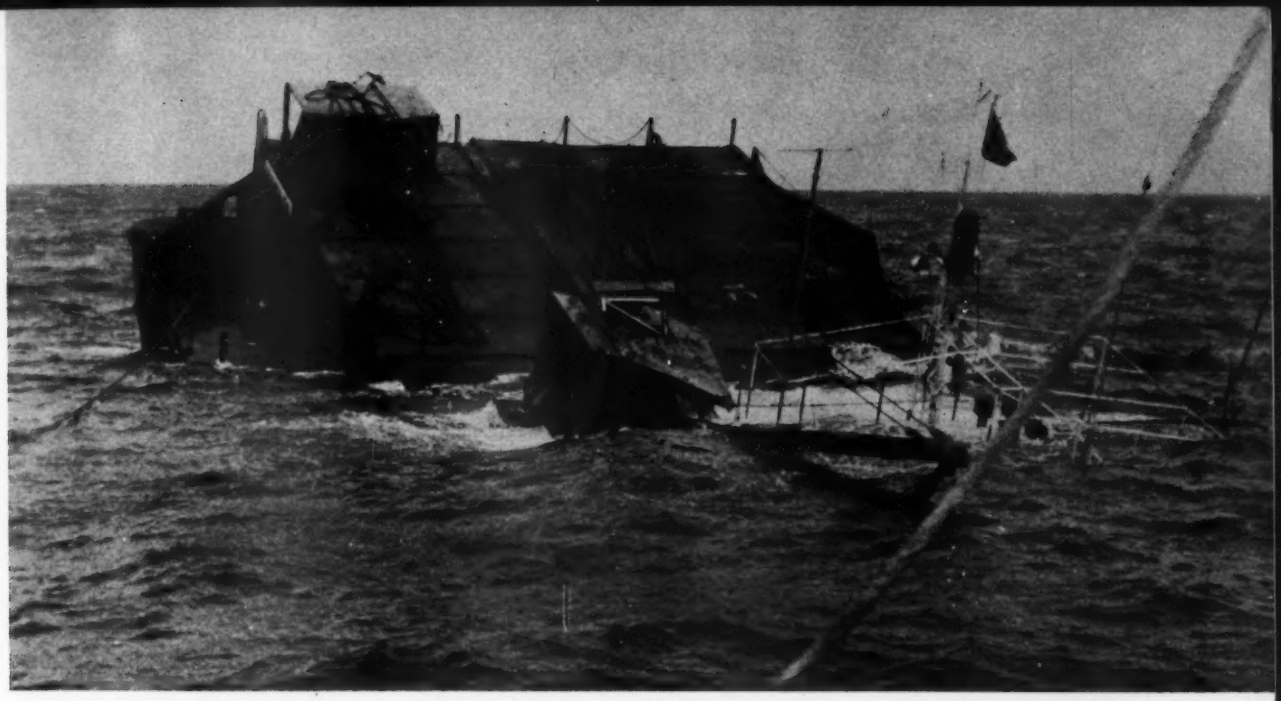
AFTER A BLOWOUT AND FIRE that nearly destroyed the C. E. Thornton, above right, the mobile unit has achieved a notable success, punching down one prolific oil find after another in the Persian Gulf. The unit is owned by Reading & Bates Offshore Drilling Company of Tulsa, Okla., leased to International Drilling Company.

Strikes in the Persian Gulf have continued at a phenomenal pace during the past year.

In the Kuwait-Saudi Arabia Neutral Zone, the Japanese-owned Arabian Oil Company continued one of the outstanding petroleum success stories of the century by bringing in 14 prolific producers without a single dry hole. Average production for each well on the offshore concession is in excess of 6,000 bpd.

A drilling well, Khafi No. 16, then blew out and caught fire, heavily damaging a platform and rig. A drilling tender belonging to Southeastern Drilling Company of Dallas, Texas escaped damage when it was cut loose from the platform.

The blowout in northern Khafi field was apparently caused by the same shallow high-pressure sand which very nearly put Arabian Oil out of business on its very first try in the Persian Gulf, and very nearly caused the loss of the mobile unit C.E. Thornton. The unit was heavily damaged before the wild well could



DOWN IN THE PERSIAN GULF is Aramco's drill barge "Queen Mary," with its bow afloat while its stern rests on the bottom in 45-ft. water. The vessel was swamped and sank last Dec. 20. It was later salvaged but Aramco brought in a new tender purchased in the U.S. (see below) for use in its offshore Safaniya field.

IN THE FABULOUS PERSIAN GULF

STORIED GULF IS SCENE OF AN INTERNATIONAL OIL PLAY

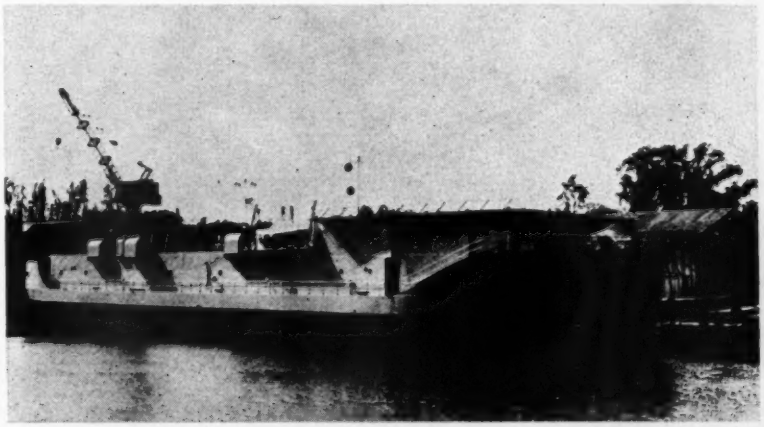
be brought under control, and Arabian Oil's initial efforts to bring in a successful offshore field suffered a severe setback.

But the company managed to solve its financial crisis and ride out the costly delay, and the C.E. Thornton started the long string of strikes that has made Khafi field a fabulous success for the Japanese. Earlier this year, the company awarded a contract in excess of $70 million for the construction of onshore production, handling and shipping facilities for its Khafi crude.

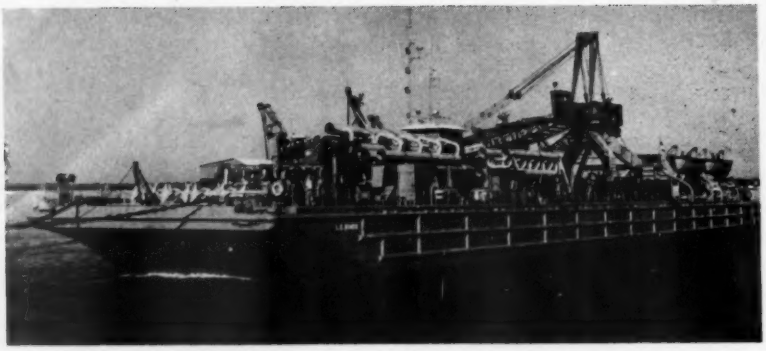
Barring a shooting war over Iraqi's attempt to annex the tiny Shaikhdom of Kuwait, Arabian Oil is expected to forge ahead as rapidly as possible in developing its concession off the Neutral Zone.

Aramco . . . Arabian American Oil Company's development program in the Safaniya offshore field received a setback with the sinking of the drilling barge **Queen Mary**. But the delay is only temporary, for the company has purchased a more modern tender on the U.S. Gulf Coast for service in the Persian Gulf.

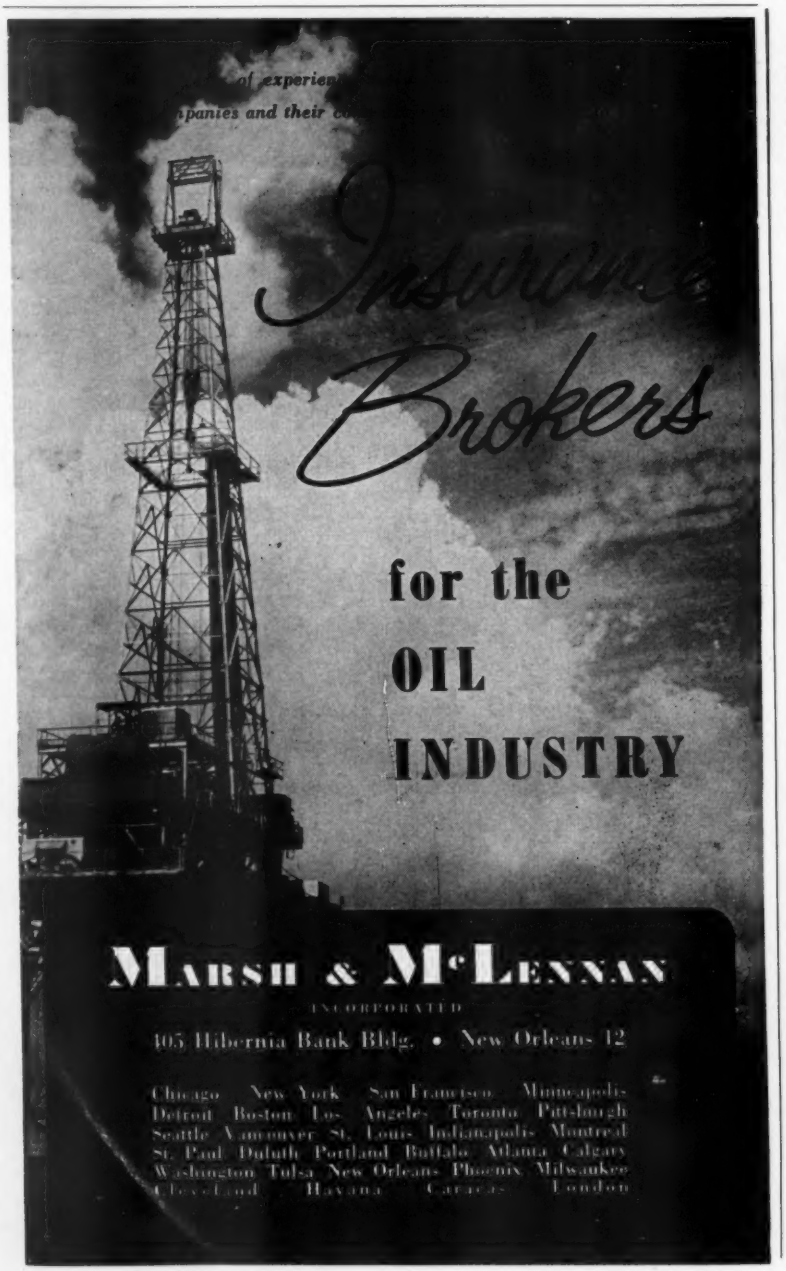
Prior to the sinking of the **Queen Mary** last December, Aramco had completed Manifa No. 7 in its Manifa field off the coast of Saudi Arabia, then released the tender for development drilling at Safaniya,



NOW THE ARAMCO DRILLING TENDER-1, the former drilling tender Carl B. Anderson was built on the U.S. Gulf Coast, purchased by Arabian American Oil Company from An-Son Drilling Company of Oklahoma City and New Orleans. The vessel replaces Aramco's sunken drill barge "Queen Mary," will be used in the company's offshore Safaniya field in the Persian Gulf.



THE LAY BARGE "L. E. MINOR" was towed from the U.S. Gulf Coast to the Persian Gulf early this year. It is being used to lay a submarine pipeline system off Iraq.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where it was on location when it swamped and sank.

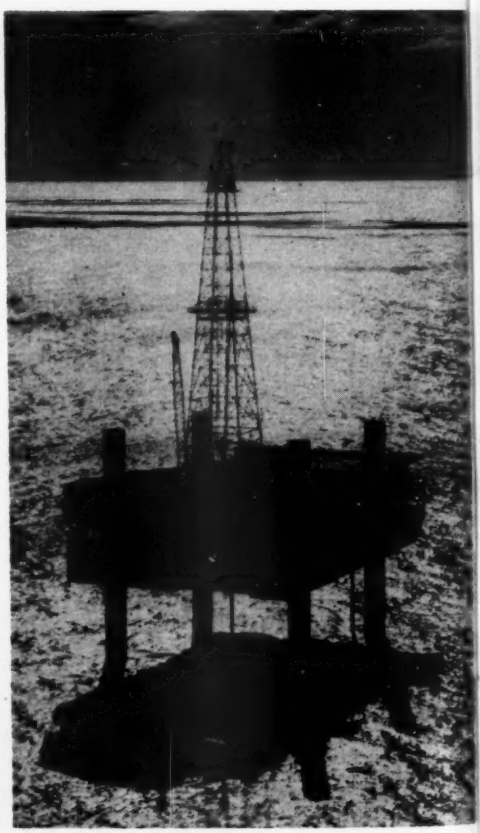
Manifa field was discovered in 1957 by an exploratory well nine miles offshore from the mainland and 140 miles northwest of Dhahran. By the end of 1960, a total of seven wells had been completed at Manifa, but the field was not put on production.

Aramco drilled only 17 wells in 1960—but increased its proved and recoverable oil reserves by 7 billion barrels!

This includes both land and sea drilling, of course, in all areas of Saudi Arabia. But marine drilling doubled the proved area of Safaniya—the world's largest offshore field.

The enormity of proved reserves in this area can best be visualized by a few figures. Although it drilled only 17 wells last year, Aramco increased its proved and recoverable reserves in Saudi Arabia to 45.6 billion barrels—or more than the proved reserves of the entire United States.

Aramco's 196 producing wells—which includes offshore wells at Sa-



ON LOCATION off Das Island in the Persian Gulf is the drill barge Adma Enterprise. The rig, built in Europe, is being used for development drilling in the Umm Shaif field.

faniya—produced a daily average of 1,247,140 barrels of crude last year. This makes Saudi Arabia the fifth largest crude-oil producing country in the world—from just 196 wells!

Yet in spite of its enormous reserves, Saudi Arabia does not rank first. That honor belongs to tiny Kuwait, which has the greatest proved reserves of crude oil of any nation in the world.

Aramco is the second largest crude oil producing organization in the world. But Kuwait Oil Company is first.

Kuwait . . . Iraq's claim to little Kuwait is undoubtedly an effort to grab the world's most valuable real estate. Beneath the arid little shaikhdom, which is only about three times the size of Harris County, Texas, lies the world's largest oil pool—over 62 billion barrels, or nearly twice the total reserves of the U.S.

Kuwait leads the Middle East countries around the Persian Gulf, which altogether contain more than 175 billion barrels of known reserves, or nearly two-thirds of the total known world supply.

Shell . . . The Royal/Dutch Shell Group in late 1960 obtained exploration rights to one of the world's few remaining oil areas with a really fabulous potential—the offshore acreage held by Kuwait in the Persian Gulf.

The company maintained the traditional 50-50 profit split, but paid Kuwait an $84 million bonus, plus a 20 percent share in a new company to develop the country's offshore acreage. Involved is all of Kuwait's territorial waters in the Persian Gulf except for a 6-mile coastal strip held by the Kuwait Oil Company.

Shell is now conducting a seismic survey of its concession, and will probably drill a first test late this year or early in 1962.

Shell has not been so fortunate in its quest for oil off Qatar, where it has spent over $20 million on an offshore search. The mobile drilling unit **Seashell**, built in Holland and towed to the Persian Gulf, has now completed three tests (earlier unsuccessful tests were drilled from a steel drilling "island," which was lost in a storm). It has been reported that the **Seashell** has made a strike at Id-El-Shargi, about 50 miles off the peninsula, but no details have been released.

SIRIP . . . SIRIP, the joint Ente Nazionale Idrocarburi-National Iranian Oil Company venture, shipped

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its first Persian Gulf crude to Italy early this year—and has reported an offshore strike of considerable dimensions. ENI President Enrico Mattei says SIRIP's first well "can produce 500 metric tons of crude oil a day." He also revealed plans to drill up to 20 wells in the area. He added that a 14-km. pipeline had been constructed to transport the oil to two base ships of 16,000 tons capacity each, anchored at sea.

But very little information has been released on Bahrganstar No. 1, the discovery well. Drilled from a fixed platform, it reportedly reached 6,992-ft., where oil was found in the Asmari limestone. Over a year went by following the discovery before production was indicated, other than rumors. This was the shipment of 18,000 tons of oil produced in tests from the Bahrganstar No. 1.

Drilling on a second well was suspended for a considerable time by a fishing job. But the sea search for oil off Iran is expected to be greatly speeded up by use of a mobile drilling platform built in Leghorn and towed to the Persian Gulf from Italy.

Abu Dhabi . . . Abu Dhabi Marine Areas Limited started exploration drilling on the Umm Shaif structure east of Das Island in the Persian Gulf early in 1958.

By May of this year, three wells had been completed by the mobile drilling unit **Adma Enterprise,** built in Europe and towed to the Persian Gulf. No. 1 well found oil at about 5,500-ft., but results from the No. 2 well were disappointing. No. 3 found oil at 9,600-ft., in quantities "sufficiently encouraging to embark on preparations for commercial production."

Abu Dhabi Marine Areas, which is owned two-thirds by British Petroleum and one-third by Compagnie Francaise des Petroles, is developing its Das Island base as an operating center and export terminal for the oilfield.

The Umm Shaif field, about 20 miles east of Das Island, will be linked to the onshore facilities by an 18-in. submarine pipeline. The main pipeline will start at a collecting platform near the center of the field, to which each producing well will be connected by 6-in. or 8-in. submarine lines.

On Das Island the main pipeline will terminate at gas/oil separators and the crude will be pumped to a tanker loading berth through a 26/28-in. diameter pipeline, of which about half will be a submarine section as the tanker berth itself will be offshore. Both the crude loading pumps and the new electric generating equipment will be driven by gas turbines operating on gas from the separators.

On the island, considerable initial work has already been completed. Contract for the submarine pipeline system has been let, as well.

Pan American . . . Iran Pan American Oil Company has drilled two exploratory wells on its 3,840,000-acre concession in the Persian Gulf. Iran Pan American (NIOC and Pan Am) has the Offshore Company's mobile unit **No. 56** under lease, and has a drilling tender towed out from the US. Gulf Coast which is being used to support drilling operations from a platform.

IPAC's first well was drilled to a total depth of 13,151-ft., and was dry.

A second well, drilled about 44 miles southeast of the first well on the 6,177 sq. mile concession, was punched down to 12,497-ft. and abandoned as non-commercial.

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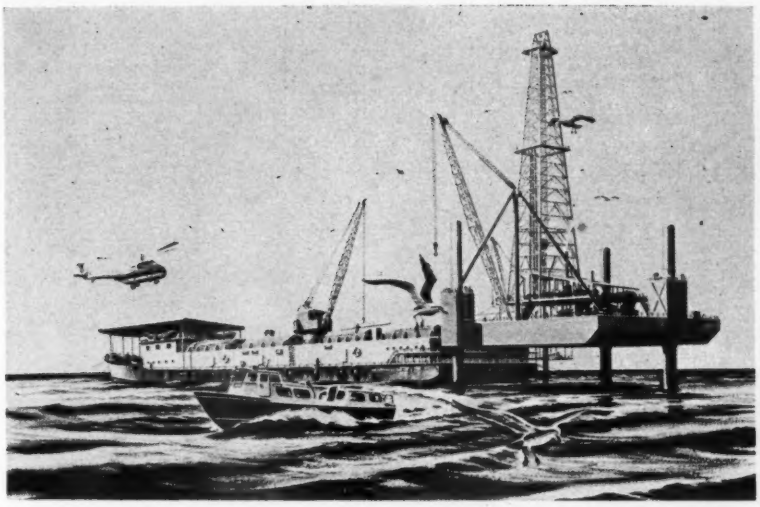

ARTIST'S CONCEPTION of The Offshore Company's Rig 59 and accompanying tender, which will spud a well this month for Mobil International off Gabon.

Marine oil round-up

TO DRILL OFF GABON

RIG UNDER TOW FROM U. S.

Mobil International and its French partner, SPAEF, will spud an offshore wildcat this month off Gabon—the first such test to be drilled in the franc zone.

Mobil is the operator on the concession, and will use a tri-legged drilling barge constructed on the U.S. Gulf Coast and now under tow to the location off Gabon. The rig is owned and will be operated by The Offshore Company of Baton Rouge, La., which also has a tender under tow to the location in the Atlantic off the coast of Africa.

Gabon, formerly part of French Equatorial Africa, is an independent republic which voluntarily chose to remain with the French community of nations and territories. The first location for The Offshore Company's **Rig 59** and tender is expected to be about five miles offshore from the town of Equeta, which means "Equator."

Rig 59 is a self-elevating drilling platform with three 200-ft. legs, enabling it to operate in water nearly 150-ft. deep.

Marine oil round-up

BIG YEMEN CONCESSION

INCLUDES ACREAGE IN RED SEA

Independent oilman John W. Mecom of Houston, Texas has been granted a concession in Yemen covering 10,000 sq. miles of the coastal plain and offshore waters of the Red Sea kingdom, and has already spudded a 5,000-ft. wildcat to test an onshore structure.

The concession was granted to Mecom by the Imam of Yemen, and

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covers an area formerly held by the Overseas Investment Corp.

The concession provides for a 5-year exploration period and a 30-year development period. Exploration equipment, vehicles and planes necessary for an extended exploration program were shipped from Houston to Salif, a city on the Red Sea which Mecom is using for operating headquarters.

There is no production in Yemen. No wells have ever been drilled in the country for oil or gas.

Nigeria

Pace Quickens As Oil Search Turns To The Sea

While the search for oil in Nigeria has been going on for over two decades, the first success was attained only five years ago.

Drilling in the country—which became independent just last year—has been conducted in some of the worst terrain in the world. Shell BP solved some of its problems in the tidal swamps by bringing in a shallow-water drilling barge, the SB-1. The barge drilled Nigeria's deepest oil well, finished in June, 1960 near the mouth of the Ramos River, Delta Province, in the western zone. The well reached 14,020-ft. after 73 days of drilling.

All of Nigeria's production, some 35,000 bpd, comes from four Shell-BP fields in the delta region. Shell-Bp, Mobil and Tennessee Gas Transmission Company all hold license on both inshore and offshore acreage. Gulf Oil and American Overseas, an affiliate of California-Texas, have filed for offshore prospecting permits.

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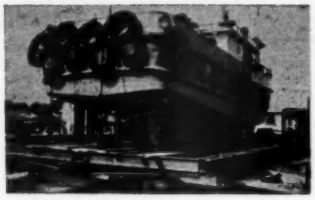

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TEST AT AMPA PATCHES, 25 miles off British Borneo, was drilled from this platform, abandoned as dry. Platform, which featured a heliport and air-conditioned quarters, was later used to drill a dry hole off Sarawak.

Marine oil round-up

BORNEO DUSTERS

SEA SEARCH FAILURE

Offshore drilling into the bed of the South China Sea around the coast of British Borneo has been carried on sporadically for a number of years, without any notable success.

Brunei Shell Petroleum Company is now using a mobile drilling unit, the **Orient Explorer,** to implement its offshore program. The barge was built in England at a cost of $2.8 million, and towed to Borneo where outfitting upped the total cost to about $5 million.

The unit has drilled at Sungei Anduki, in Seria, and elsewhere without announcement of commercial production.

The first offshore drilling in the area took place at Seria, from a platform erected about one mile from shore. Land communications were by ropeway. Other platforms were installed near the shore, with many deviated wells drilled under the sea. This initial production program met with considerable success, but further efforts at a greater distance from shore have garnered only failure.

A dry hole was drilled at Ampa Patches, some 25 miles offshore. The platform was salvaged and moved to Siwa, eight miles off the Sarawak coast, but again results were disappointing. The story was repeated off the separate territory of British North Borneo, where a well drilled from a fixed platform to nearly 9,000-ft. at Hankin Shoal was also abandoned.

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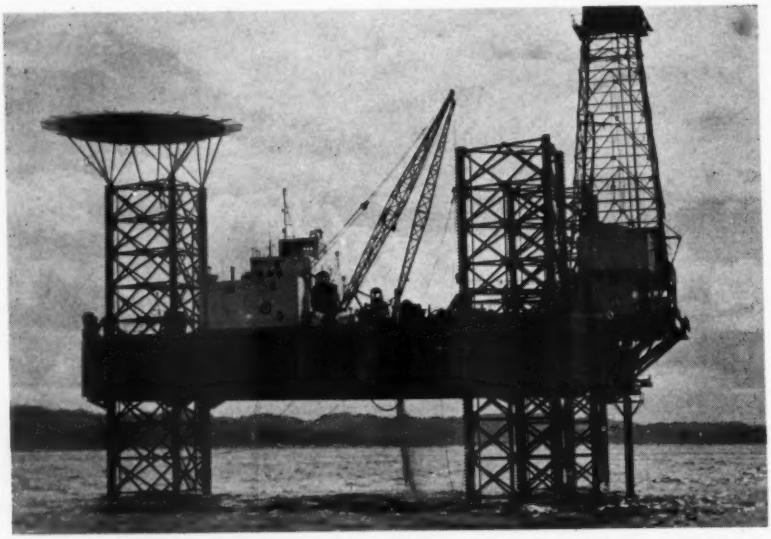
Marine oil round-up

JAPAN HAS OFFSHORE OIL, GAS

MARINE FIELDS IMPORTANT TO NATION'S ECONOMY



DRILL BARGE "HAKURYU" brought in Japan's first offshore well late in 1959, has since been doing development drilling in the Tsuchizaki offshore field. The unit was ordered in the U.S., assembled in an Akita, Japan shipyard.

The Japanese oil industry, for many years, has operated a number of small fields on the western side of its principal islands. But combined production from all of the fields amounted to only 4 percent of domestic needs, which made discovery of oil in the Sea of Japan all the more important.

The discovery well was brought in late in 1959 west of Akita. Drilled about one and one-half miles from shore in 50-ft. of water by the mobile unit **Hakuryu** (White Dragon), SK 1 flowed at the rate of 124 bpd on initial tests from 1,775-1,908-ft. The well was drilled to a total depth of 4,760-ft.

The well, drilled by Oil Resources Development Company, jointly owned by Teikoku Oil Company and the Japanese government, represented the third attempt to find oil off the coast of Japan with the **Hakuryu**—a mobile unit ordered in the U.S. and assembled in an Akita shipyard.

With offshore production established, development work has gone ahead as rapidly as possible. The mobile unit has been used to drill six additional wells—four of them drilled directionally from two central locations. A submarine line has been laid to the offshore field, which is now producing about 1,000 bpd.

Offshore gas . . . In Niigata prefecture, Teikoku Oil Company has erected a permanent drilling-production platform 1,000-ft. offshore to follow its Kubiki gas field out under the sea. The first well drilled from the platform reportedly tapped a new producing zone. Up to seven additional wells will be drilled from the platform. Several have already been completed.

Including onshore wells, Teikoku has about 30 producing wells in the field, with daily output rated at 18,000 mcf of gas and 630 bbls. of condensate per day. The producing company expects to sell the gas in Tokyo for household consumption.

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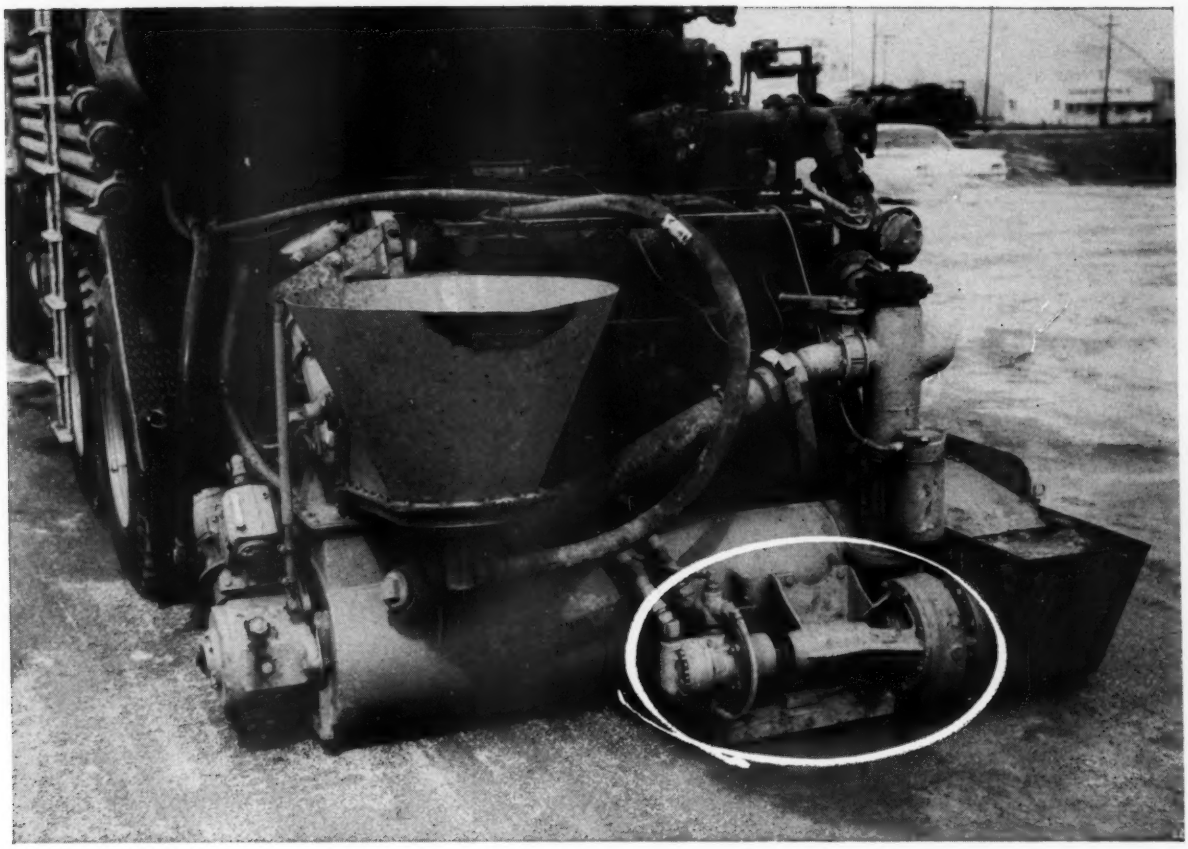

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